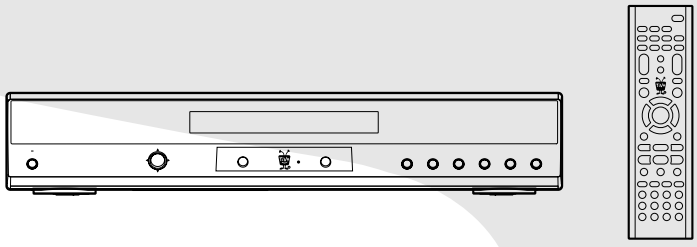
TOSHIBA

FILE NO. 810-200329

SERVICE MANUAL

DIGITAL MEDIA SERVER

SD-H400



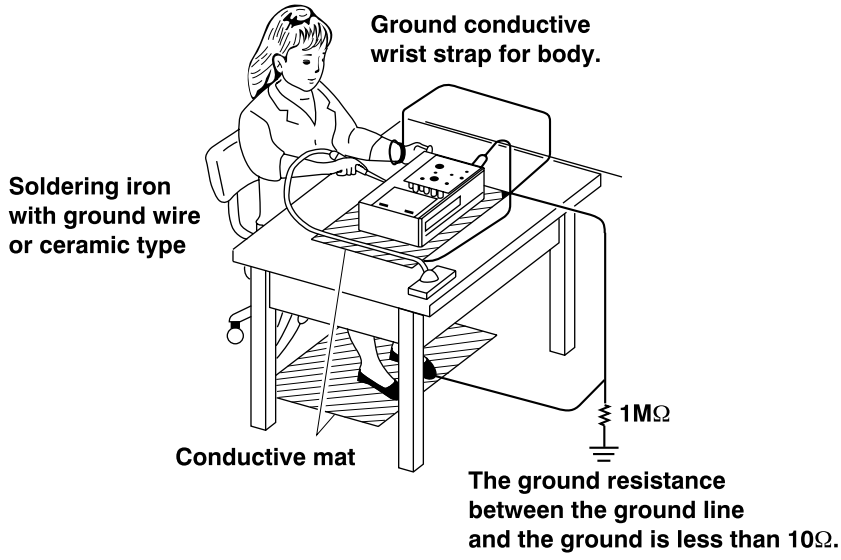
DOCUMENT CREATED IN JAPAN, Sep., 2003

PREPARATION OF SERVICING

Pickup Head consists of a laser diode that is very susceptible to external static electricity.

Although it operates properly after replacement, if it was subject to electrostatic discharge during replacement, its life might be shortened. When replacing, use a conductive mat, soldering iron with ground wire, etc. to protect the laser diode from damage by static electricity.

And also, the LSI and IC are same as above.



SAFETY NOTICE

SAFETY PRECAUTIONS

LEAKAGE CURRENT CHECK

Plug the AC line cord directly into a 120V AC outlet (do not use an isolation transformer for this check). Use an AC voltmeter, having 5000 Ω per volt or more sensitivity.

Connect a 1500 Ω 10 W resistor, paralleled by a 0.15 μF 150V AC capacitor between a known good earth ground (water pipe, conduit, etc.) and all exposed metal parts of cabinet (antennas, handle bracket, metal cabinet screwheads, metal overlays, control shafts, etc.).

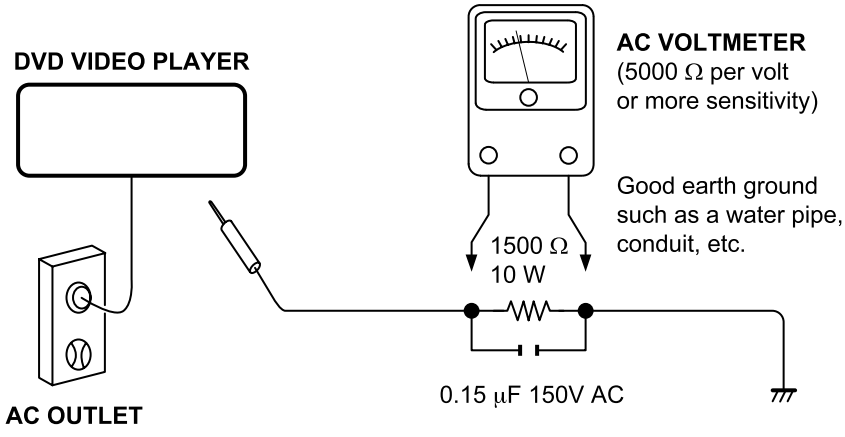
Measure the AC voltage across the 1500 Ω resistor.

The test must be conducted with the AC switch on and then repeated with the AC switch off. The AC voltage indicated by the meter may not exceed 0.3 V. A reading exceeding 0.3 V indicates that a dangerous potential exists, the fault must be located and corrected.

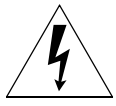
Repeat the above test with the DVD VIDEO PLAYER power plug reversed.

NEVER RETURN A DVD VIDEO PLAYER TO THE CUSTOMER WITHOUT TAKING NECESSARY CORRECTIVE ACTION.

READING SHOULD NOT EXCEED 0.3V



Test all exposed metal.
Voltmeter Hook-up for Leakage Current Check



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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ABBREVIATIONS
   - (1) Integrated Circuit (IC)
   - (2) Capacitor (Cap)
   - (3) Resistor (Res)

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   - 1-2. Chassis Assembly
2. PARTS LIST

SECTION 1
GENERAL DESCRIPTIONS

1. OPERATING INSTRUCTIONS

Please refer to the owner's manual about the contents.

2. LOCATION OF MAIN PARTS AND MECHANISM PARTS

2-1. Location of Main Parts

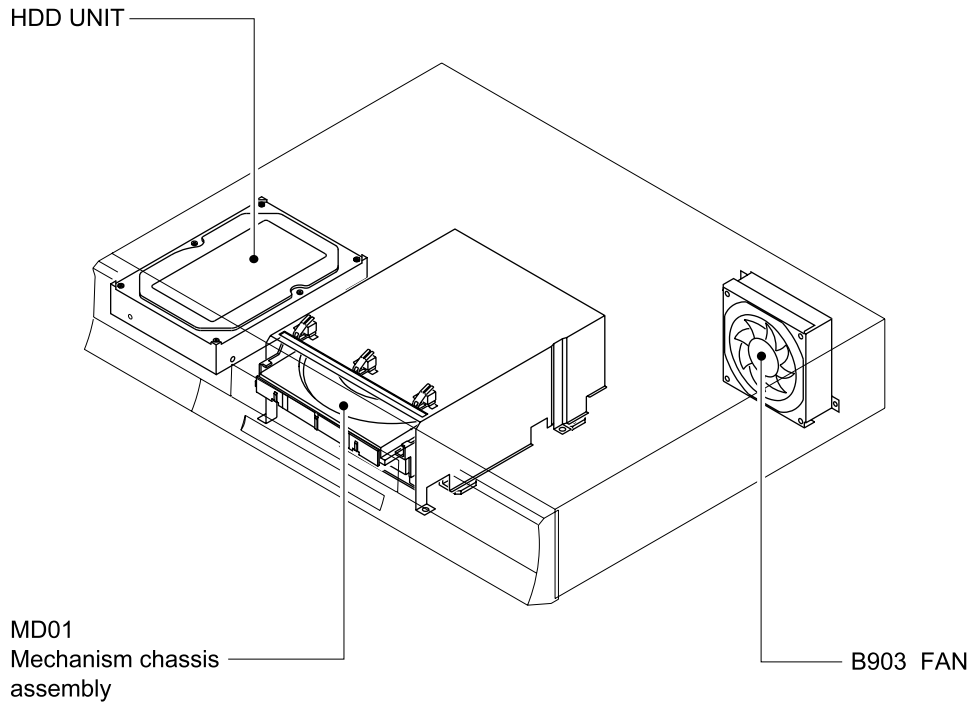


Fig. 1-2-1

2-2. Location of PC Boards

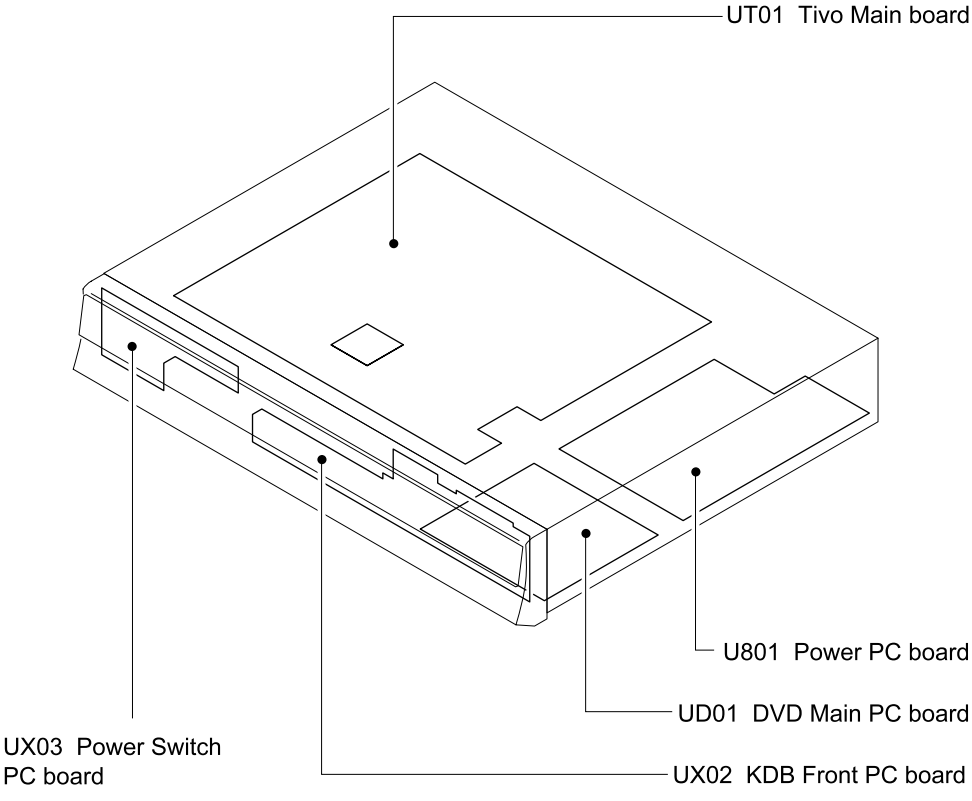


Fig. 1-2-2

SECTION 2
PART REPLACEMENT AND ADJUSTMENT PROCEDURES

CAUTIONS BEFORE STARTING SERVICING

Electronic parts are susceptible to static electricity and may easily damaged, so do not forget to ground as required.

Many screws are used inside the unit. To prevent the screws from missing, dropping, etc.always use a magnetized screwdriver in servicing. Several kinds of screws are used and some of them need special cautions. That is, take care of the tapping screws securing molded parts and fine pitch screws used to secure metal parts. If they are used improperly, the screw holes will be easily damaged and the parts can not be fixed.

1. REPLACEMENT OF MECHANICAL PARTS

1-1. Cabinet Replacement

1-1-1. Top Cover

1. Remove seven screws (1), then remove the top cover (2).

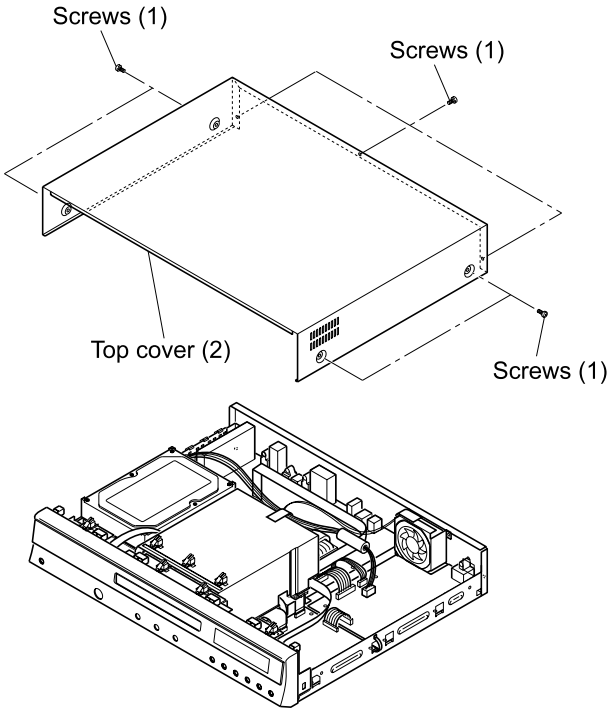


Fig. 2-1-1

1-1-2. HDD

1. Disconnect a connector (1).
2. Remove four screws (2) and a connector (3), then remove the HDD (4).

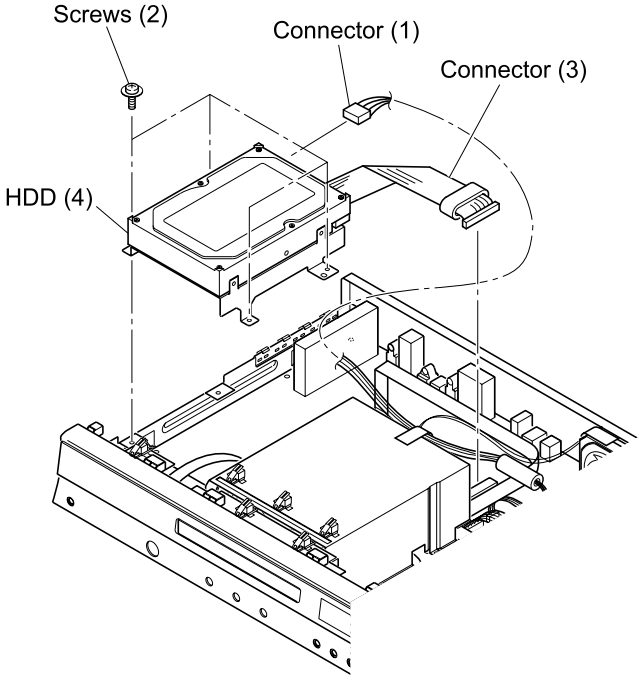


Fig. 2-1-2

1-1-3. Front Panel

1. Remove the top cover. (Refer to item 1-1-1.)
2. Remove the HDD. (Refer to item 1-1-2.)
3. Disconnect two flexible cadles (1).
4. Remove three screw (2).
5. Release five claws, then remove the front panel (3).

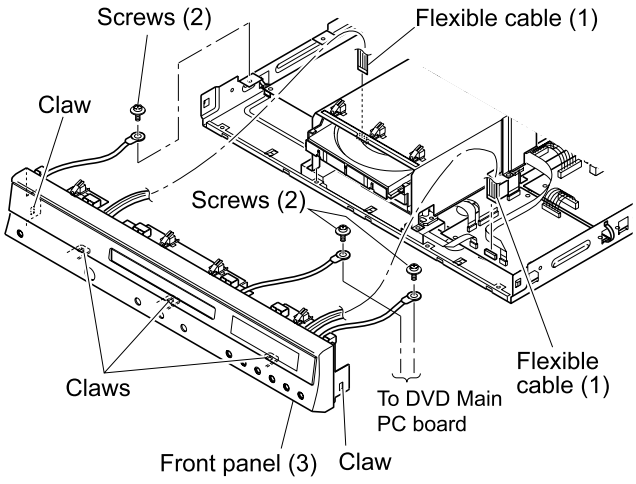


Fig. 2-1-3

1-1-4. Tray Door

1. Remove a spring (1).
2. Remove the tray door (2) while slightly bending it.

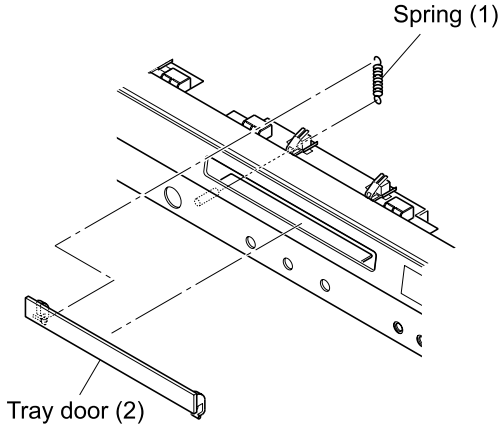


Fig. 2-1-4

1-1-5. Mechanism Chassis Assembly

Note:

- Before removing the Mechanism chassis assembly (6), be sure to short-circuit the laser diode output land.

  After replacing the Mechanism chassis assembly (6) and inserting the flexible cables (1), open the land as it was.

1. Remove the front panel. (Refer to item 1-1-3.)
2. Disconnect three flexible cables (1).
3. Peel off the tape (2) from the mechanism assembly cover (4).
4. Remove four screws (3), then remove the mechanism chassis assembly cover (4).
5. Remove four screws (5) , then remove the mechanism chassis assembly (6).

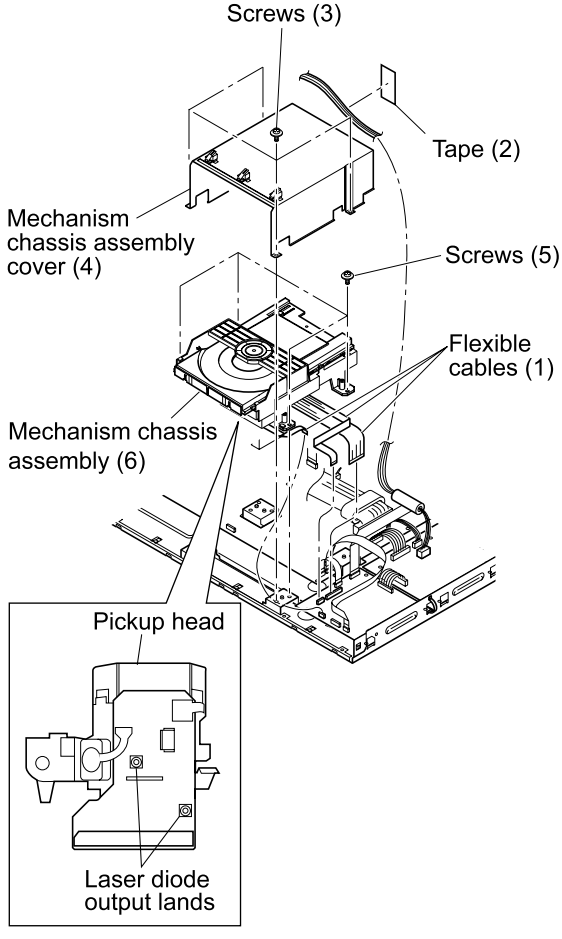


Fig. 2-1-5

1-1-6. Fan

1. Remove a connector (1) and two screws (2) .
2. Remove the fan (3).

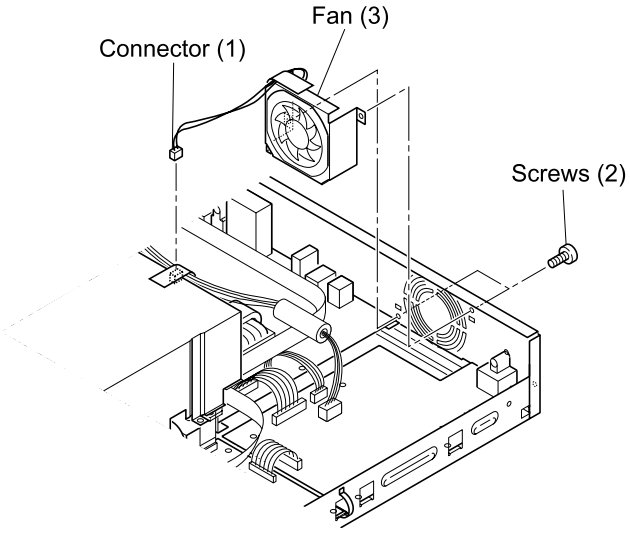


Fig. 2-1-6

1-1-7. Rear Panel

1. Remove ten screws (1).
2. Loosen two claws and remove the rear panel (2).

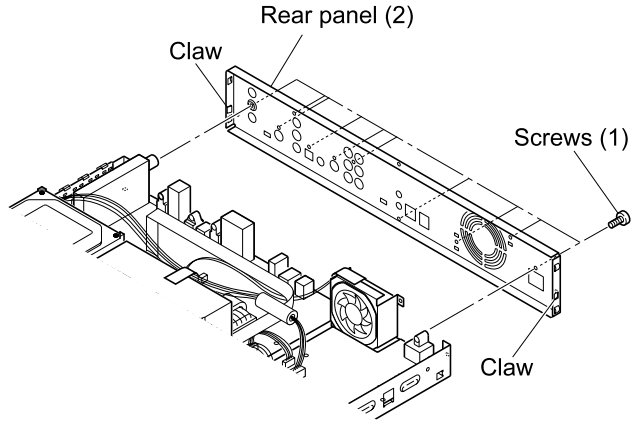


Fig. 2-1-7

1-2. PC Board Replacement

1-2-1. DVD Main PC Board

Note:

- Before removing the DVD main PC board (4), be sure to short-circuit the laser diode output land.

  After replacing the DVD main PC board (4) and inserting the flexible cables (2), open the land as it was.

1. Remove the top cover. (Refer to 1-1-1.)
2. Disconnect a connector (1).
3. Remove seven flexible cables (2).
4. Remove four screws (3), then remove the DVD main PC board (4).

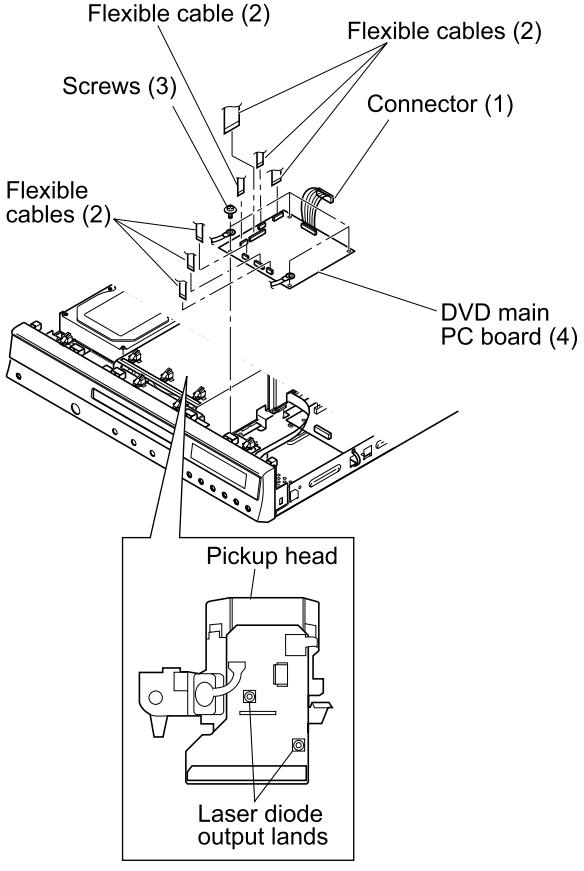


Fig. 2-1-8

Note:

- For the detailed information about DVD Main PC board connection, see Fig. 2-1-9.

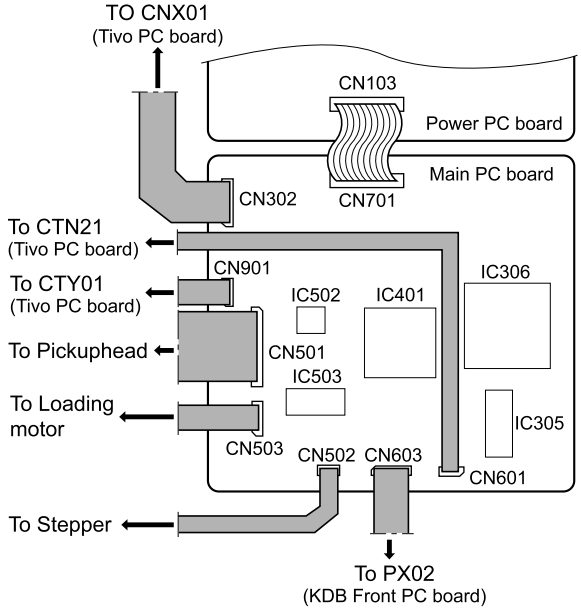


Fig. 2-1-9

1-2-2. Tivo PC Board

Cautions :

- **Danger of explosion if battery is incorrectly replaced.**
- **Replace only with the same or equivalent type of battery.**

1. Remove the top cover. (Refer to item 1-1-1.)
2. Remove the HDD. (Refer to item 1-1-2.)
3. Remove the front panel. (Refer to item 1-1-3.)
4. Remove the mechanism chassis assembly. (Refer to 1-1-5.)
5. Remove the rear panel. (Refer to item 1-1-7.)
6. Disconnect three connectors (1).
7. Remove three flexible cables (2).
8. Remove seven screws (3), then remove the tivo main PC board (4).

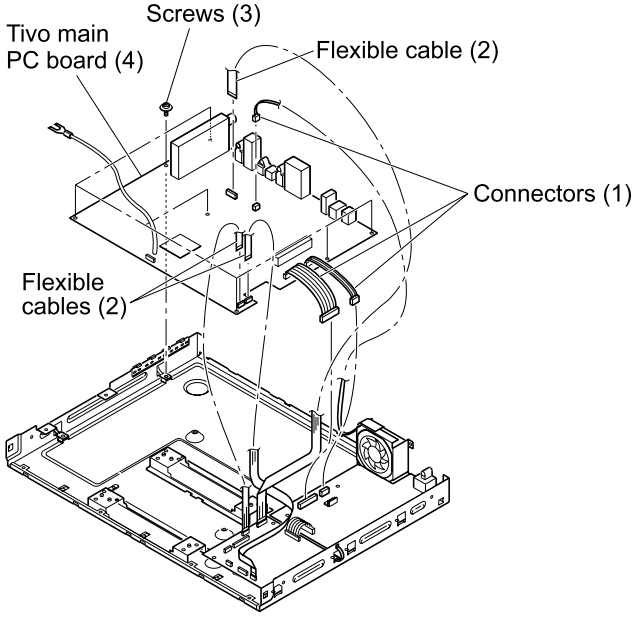


Fig. 2-1-10

1-2-3. Power PC Board

1. Disconnect four connectors (1)
2. Remove a screw (2) and four screws (3), then remove the power PC board (4).

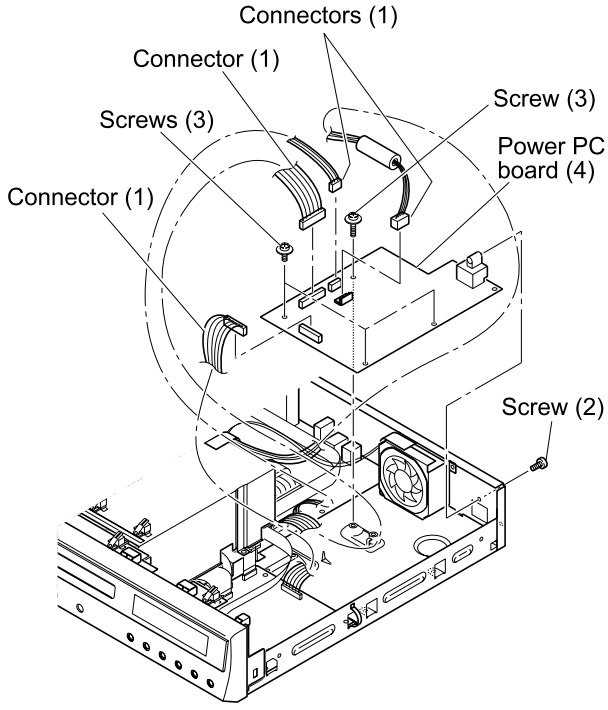


Fig. 2-1-11

1-2-4. KDB Front and Power Switch PC Board

1. Remove the front panel. (Refer to item 1-1-3.)
2. Remove five screws (1), then remove the stay (2).
3. Remove a screw (3) and two flexible cables (4), then remove the Power switch PC board (5).
4. Remove four screws (6), then remove the KDB front PC board (7).
6. Remove the three screws (8), then remove the select/enter button (9).

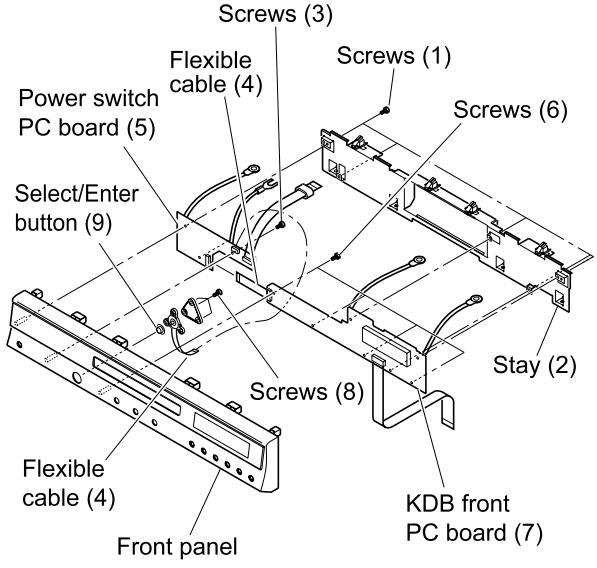


Fig. 2-1-12

SECTION 3
SERVICING DIAGRAMS

1. CIRCUIT SYMBOLS AND SUPPLEMENTARY EXPLANATION

1-1. Precautions for Part Replacement

- In the schematic diagram, parts marked ⚠ (ex. ⚠ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire etc.

1-2. Solid Resistor Indication

Unit	None ..... Ω K ..... kΩ M ..... MΩ
Tolerance	None ..... ±5% B ..... ±0.1% C ..... ±0.25% D ..... ±0.5% F ..... ±1% G ..... ±2% K ..... ±10% M ..... ±20%
Rated Wattage	(1) Chip Parts None ..... 1/16W (2) Other Parts None ..... 1/6W Other than above, described in the Circuit Diagram.
Type	None ..... Carbon film S ..... Solid R ..... Oxide metal film W ..... Metal film W ..... Cement FR ..... Fusible

Eg. 1

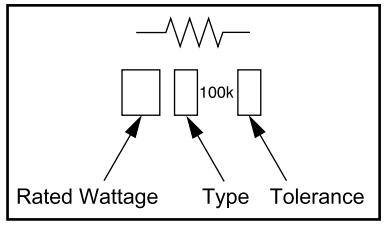


Fig. 3-1-1

1-3. Capacitance Indication

Symbol	..... Electrolytic, Special electrolytic NP ..... Non polarity electrolytic ..... Ceramic, plastic M ..... Film ..... Trimmer
Unit	None ..... F μ ..... μF p ..... pF
Rated voltage	None ..... 50V For other than 50V and electrolytic capacitors, described in the Circuit Diagram.
Tolerance	(1) Ceramic, plastic, and film capacitors of which capacitance are more than 10 pF. None ..... ±5% or more B ..... ±0.1% C ..... ±0.25% D ..... ±0.5% F ..... ±1% G ..... ±2% (2) Ceramic, plastic, and film capacitors of which capacitance are 10 pF or less. None ..... more than ±5% pF B ..... ±0.1 pF C ..... ±0.25 pF (3) Electrolytic, Trimmer Tolerance is not described.
Temperature characteristic (Ceramic capacitor)	None ..... SL For others, temperature characteristics are described. (For capacitors of 0.01 μF and no indications are described as F.)
Static electricity capacity (Ceramic capacitor)	Sometimes described with abbreviated letters as shown in Eg. 3.

Eg. 2

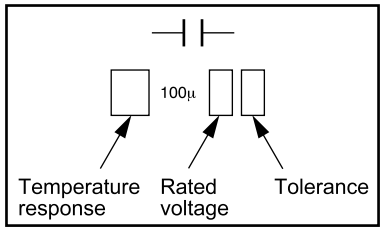


Fig. 3-1-2

Eg. 3

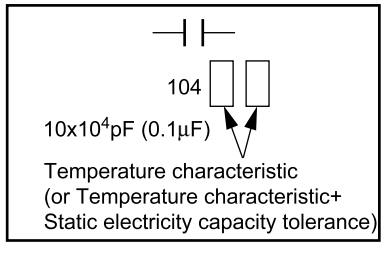


Fig. 3-1-3

1-4. Inductor Indication

Unit	None ..... H μ ..... μH m ..... mH
Tolerance	None .....±5% B .....±0.1% C .....±0.25% D .....±0.5% F .....±1% G .....±2% K .....±10% M .....±20%

Eg. 4

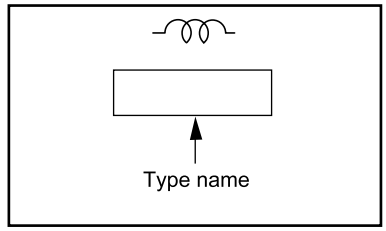


Fig. 3-1-4

1-5. Waveform and Voltage Measurement

- The waveforms for CD/DVD and RF shown in the circuit diagrams are obtained when a test disc is played back.
- All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

Eg. 5

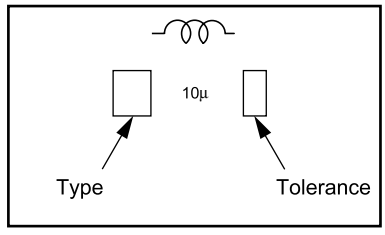


Fig. 3-1-5

1-6. Others

- The parts indicated with "NC", "KETSU" or "NO STUFF" etc. are not used in the circuits of this model.

2. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

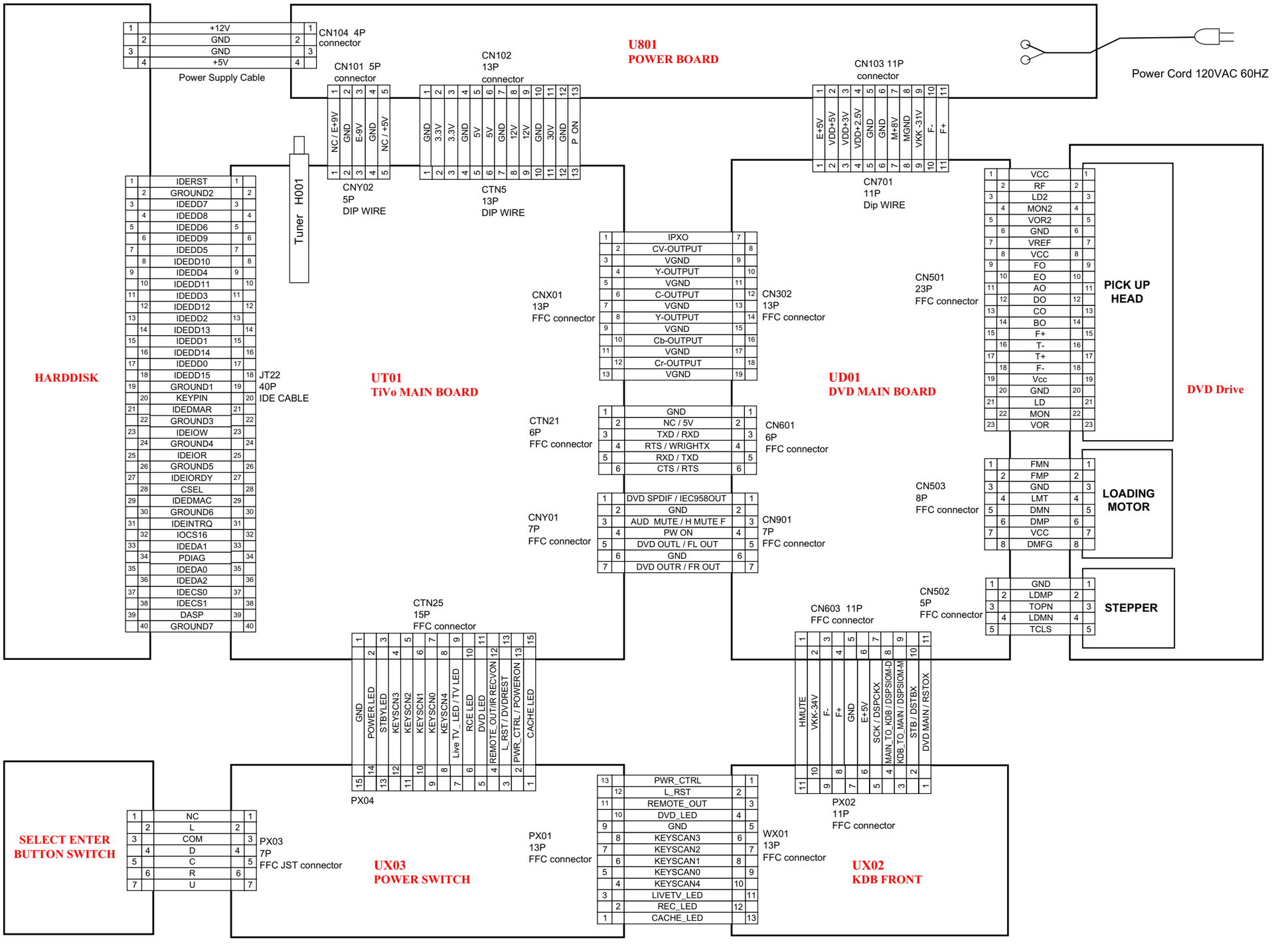


Fig. 3-2-1

3. BLOCK DIAGRAMS

3-1. DVD Overall Block Diagram

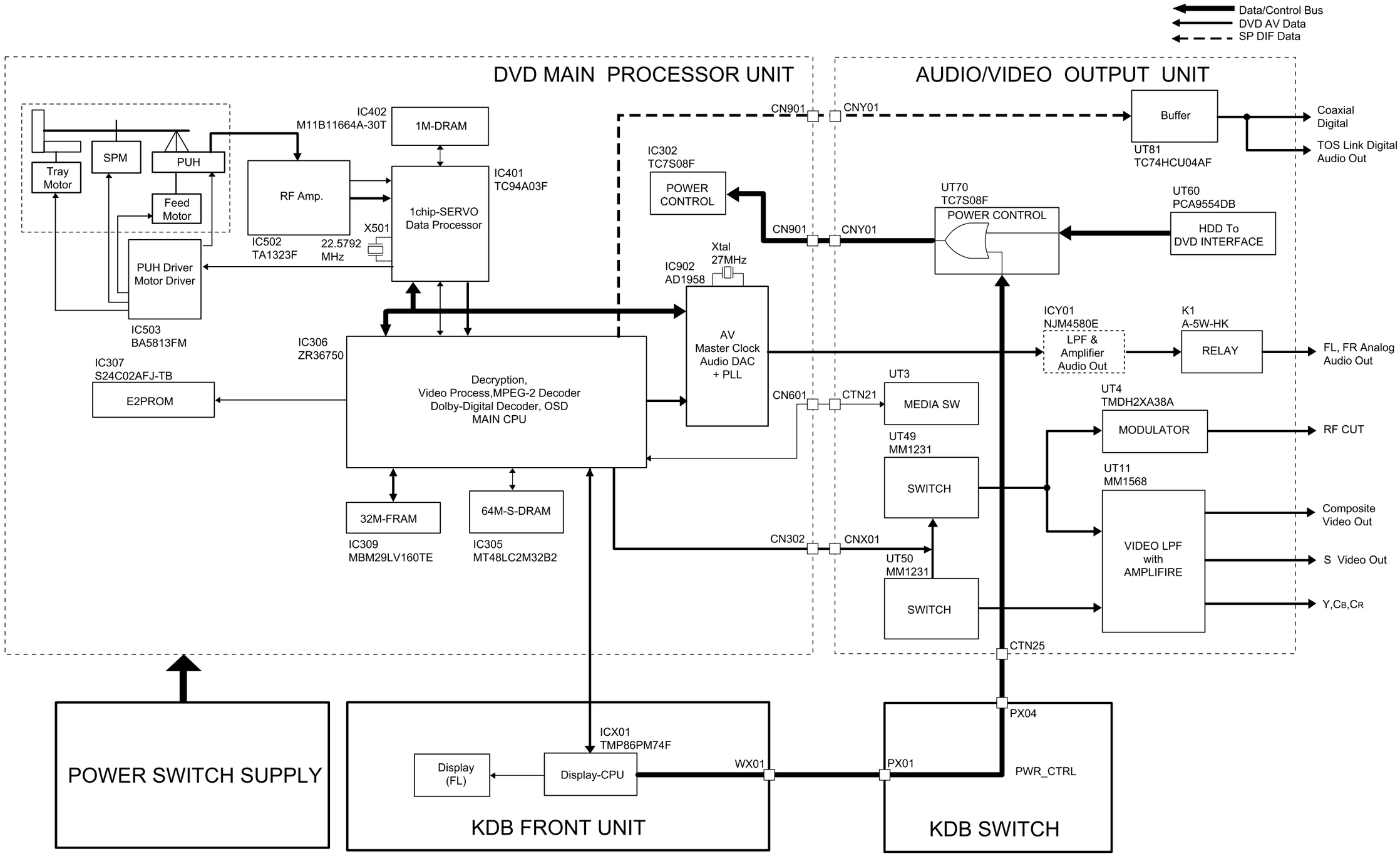


Fig.3-3-1

3-2. Power Supply Block Diagram

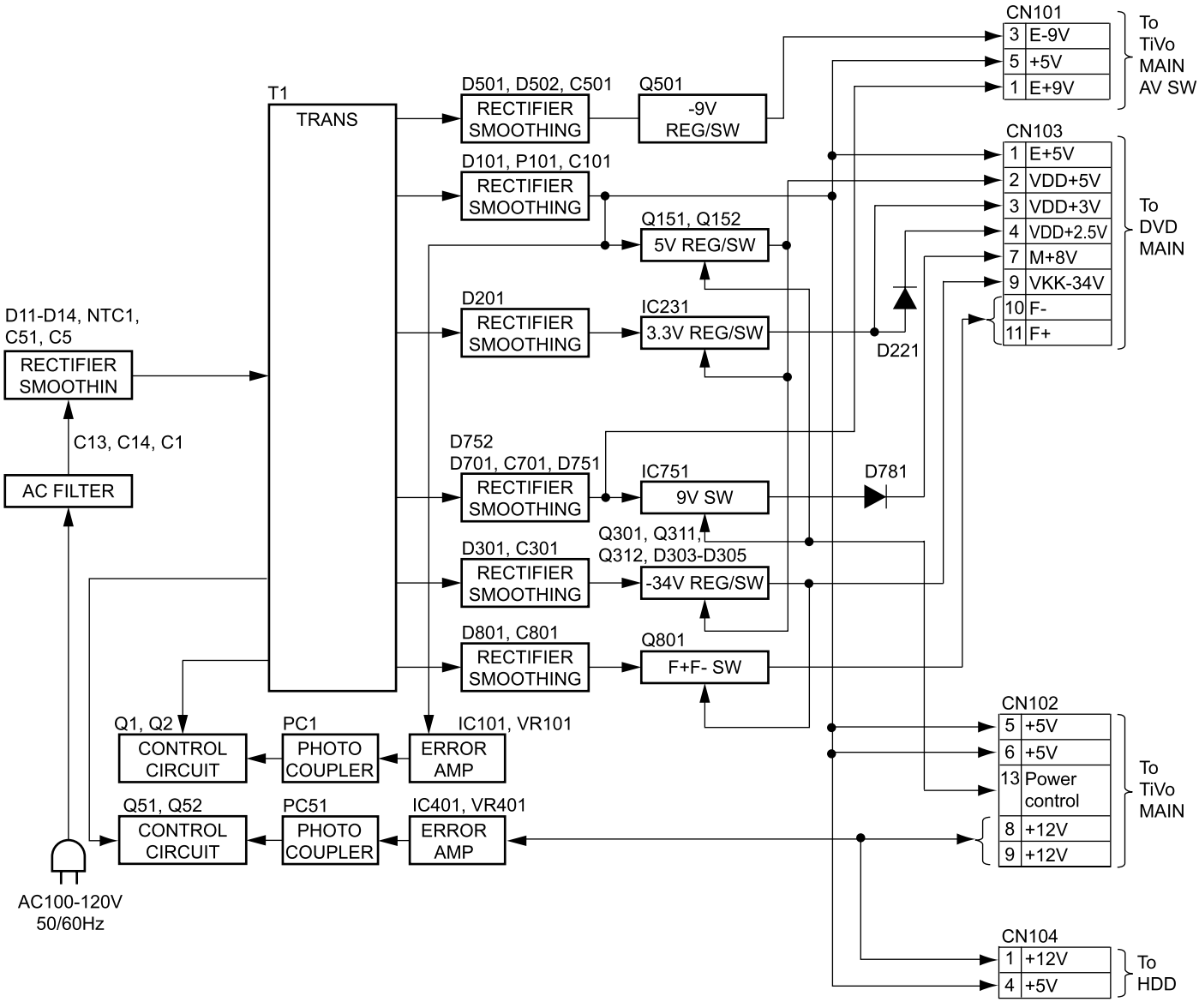


Fig. 3-3-2

3-3. KDB Front, Power Switch Block Diagram

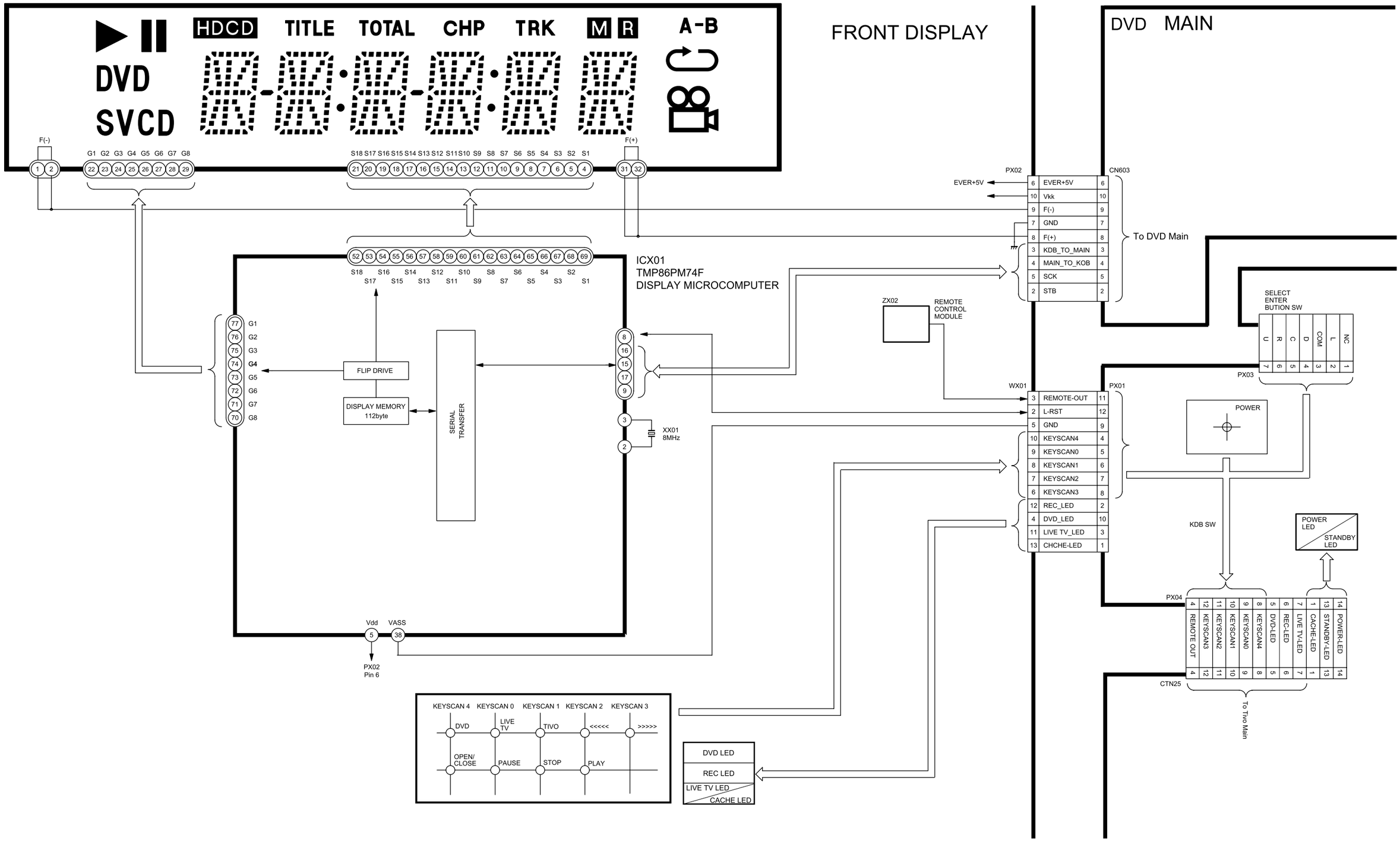


Fig. 3-3-3

3-4. Logical System Block Diagrams (DVD)

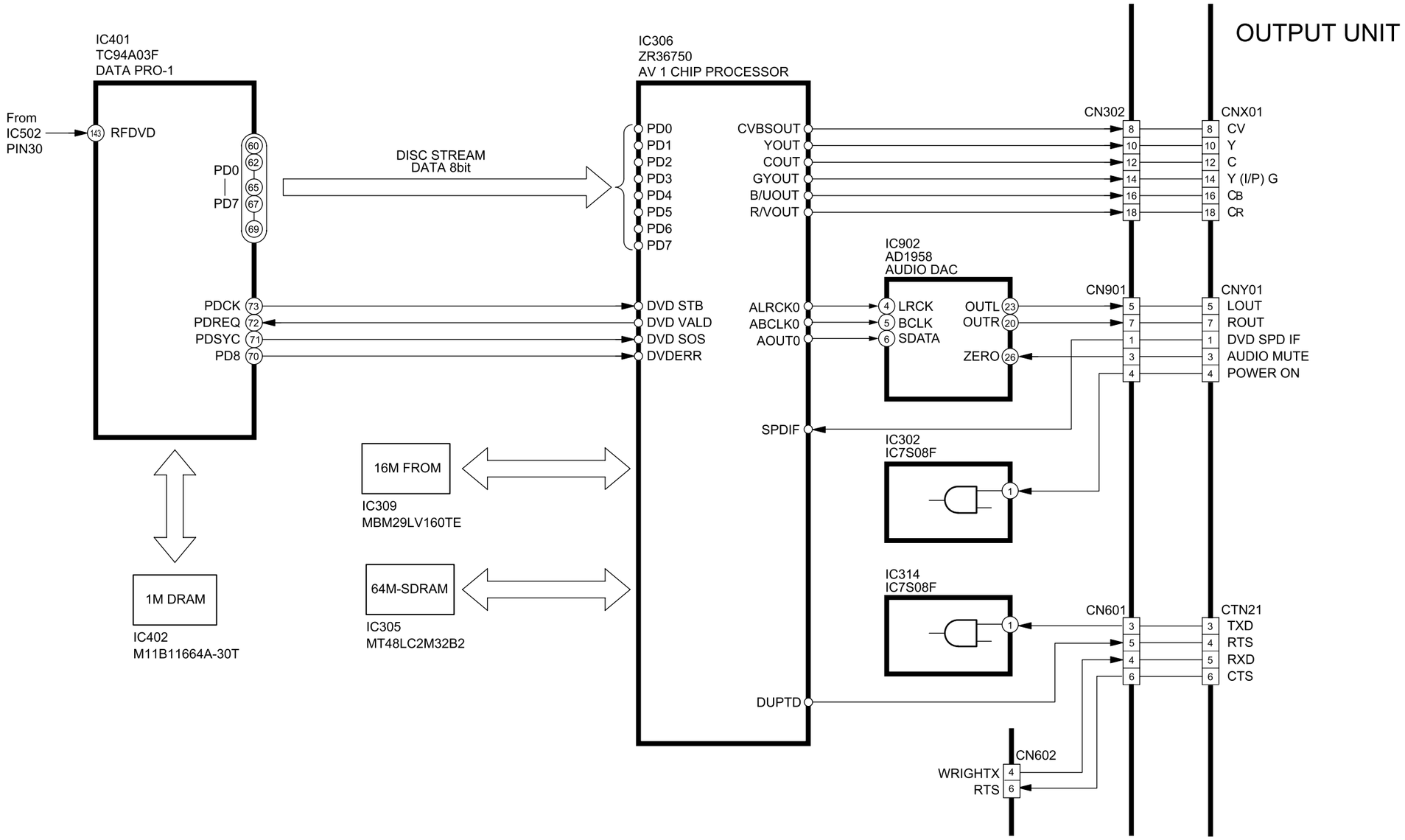


Fig.3-3-4

3-5. Output Block Diagram (DVD)

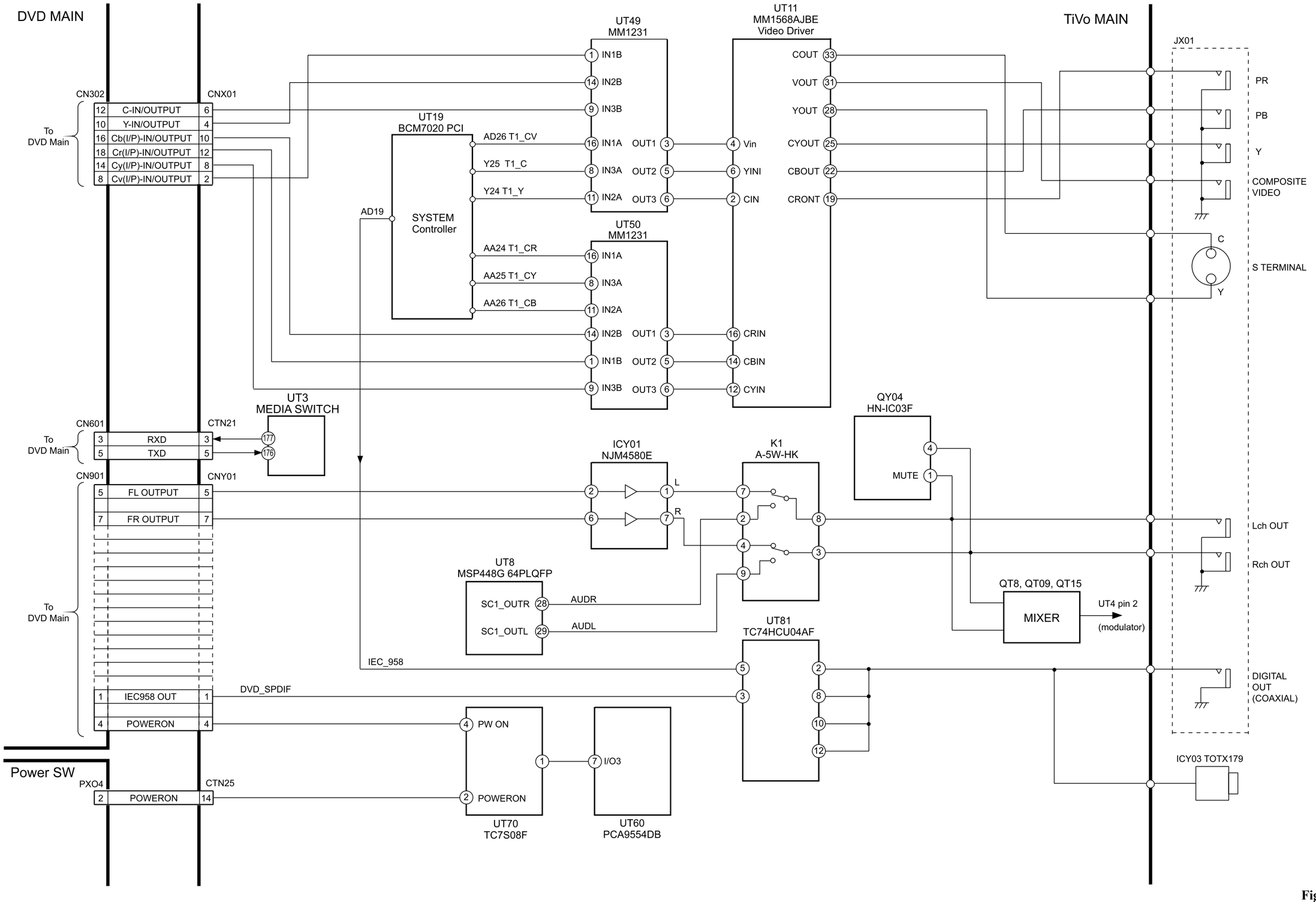


Fig. 3-3-5

3-6. Tivo Block Diagram

3-6-1. Tivo Block Diagram 1

(Please refer to next page for exploded Audio/Video switch & driver block diagram.)

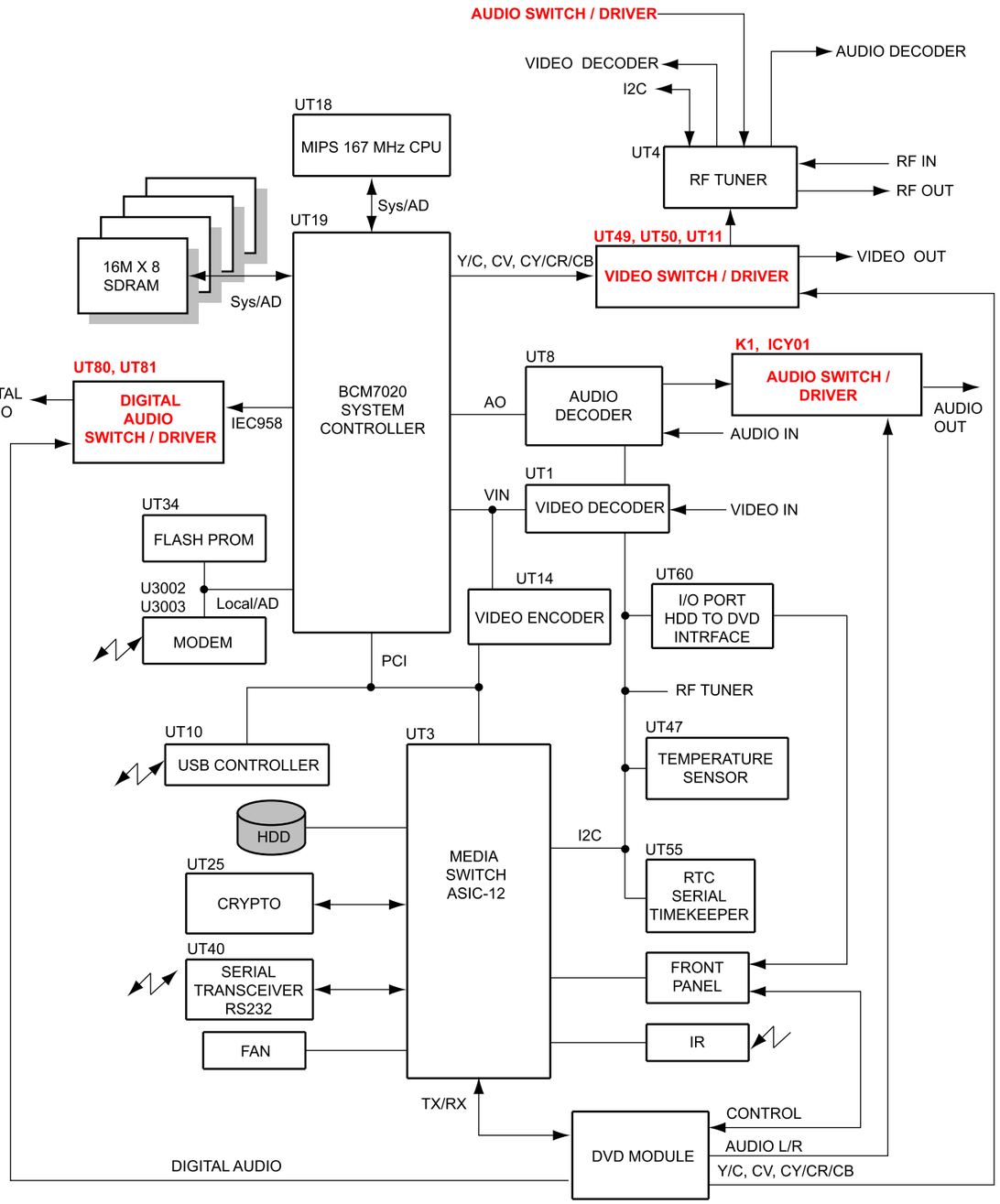


Fig. 3-3-6

3-6-2. Tivo Block Diagram 2

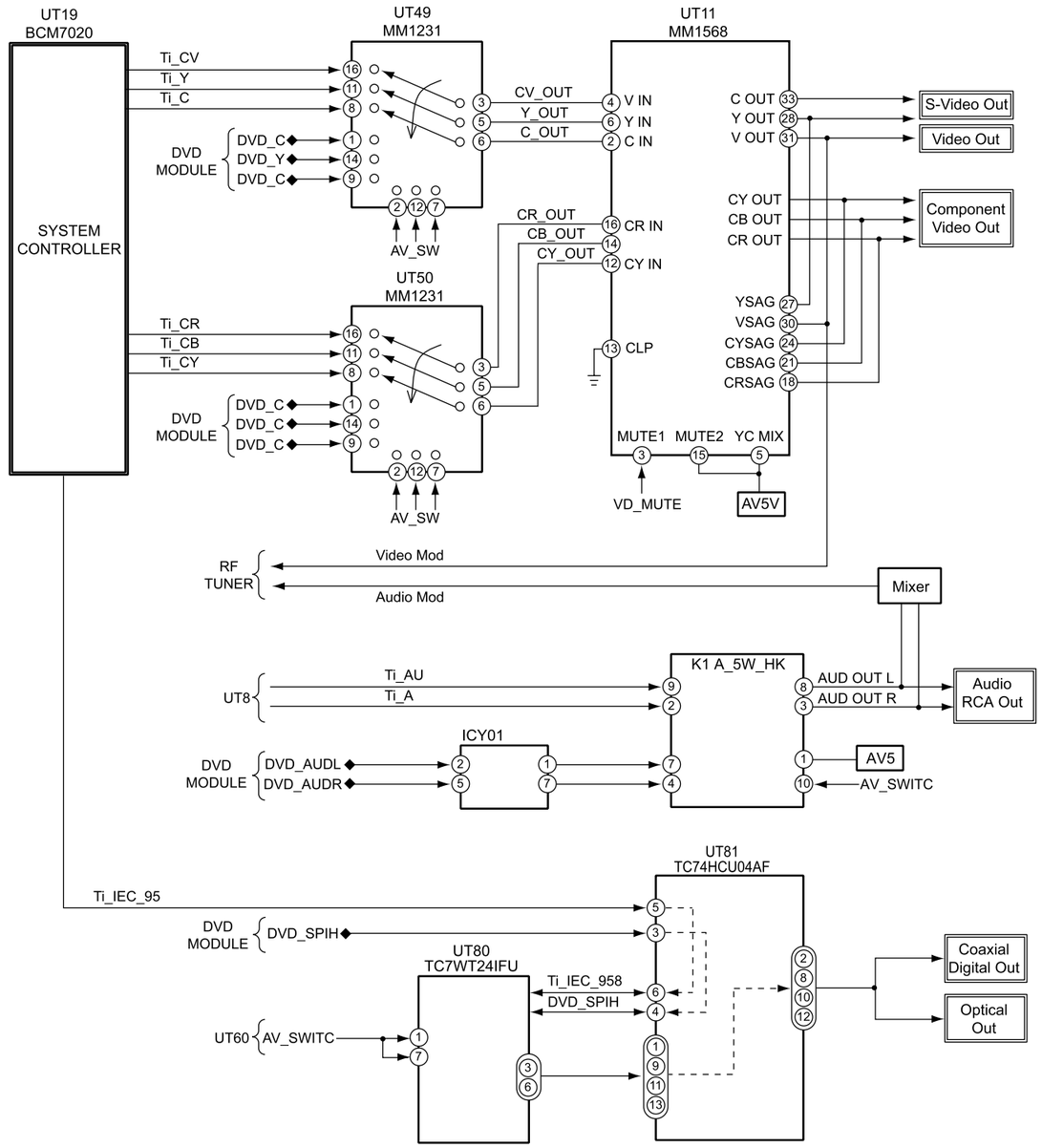


Fig. 3-3-7

4. CIRCUIT DIAGRAMS

4-1. Power Supply Circuit Diagram

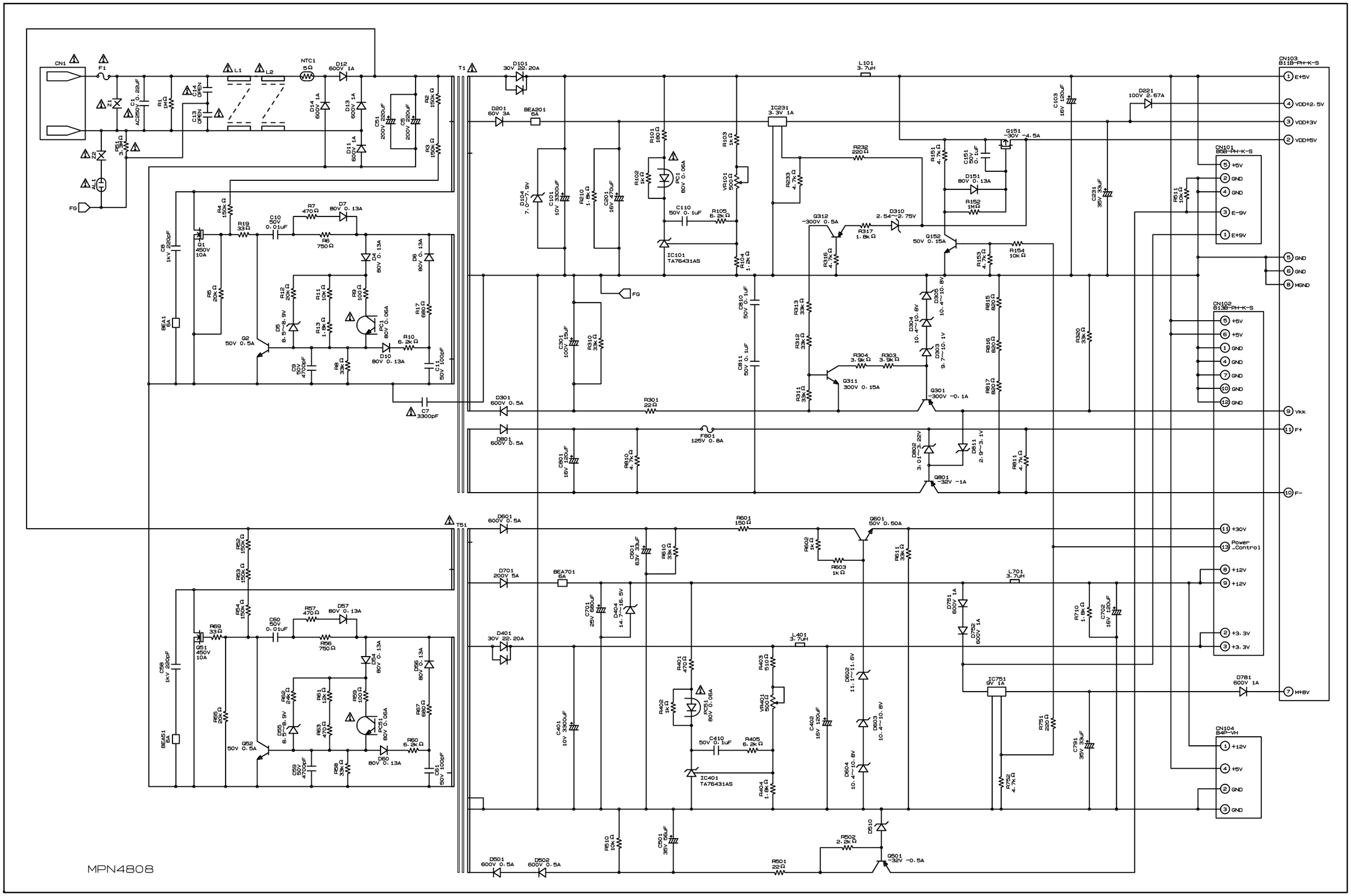


Fig. 3-4-1

4-2. KDB Front Circuit Diagram

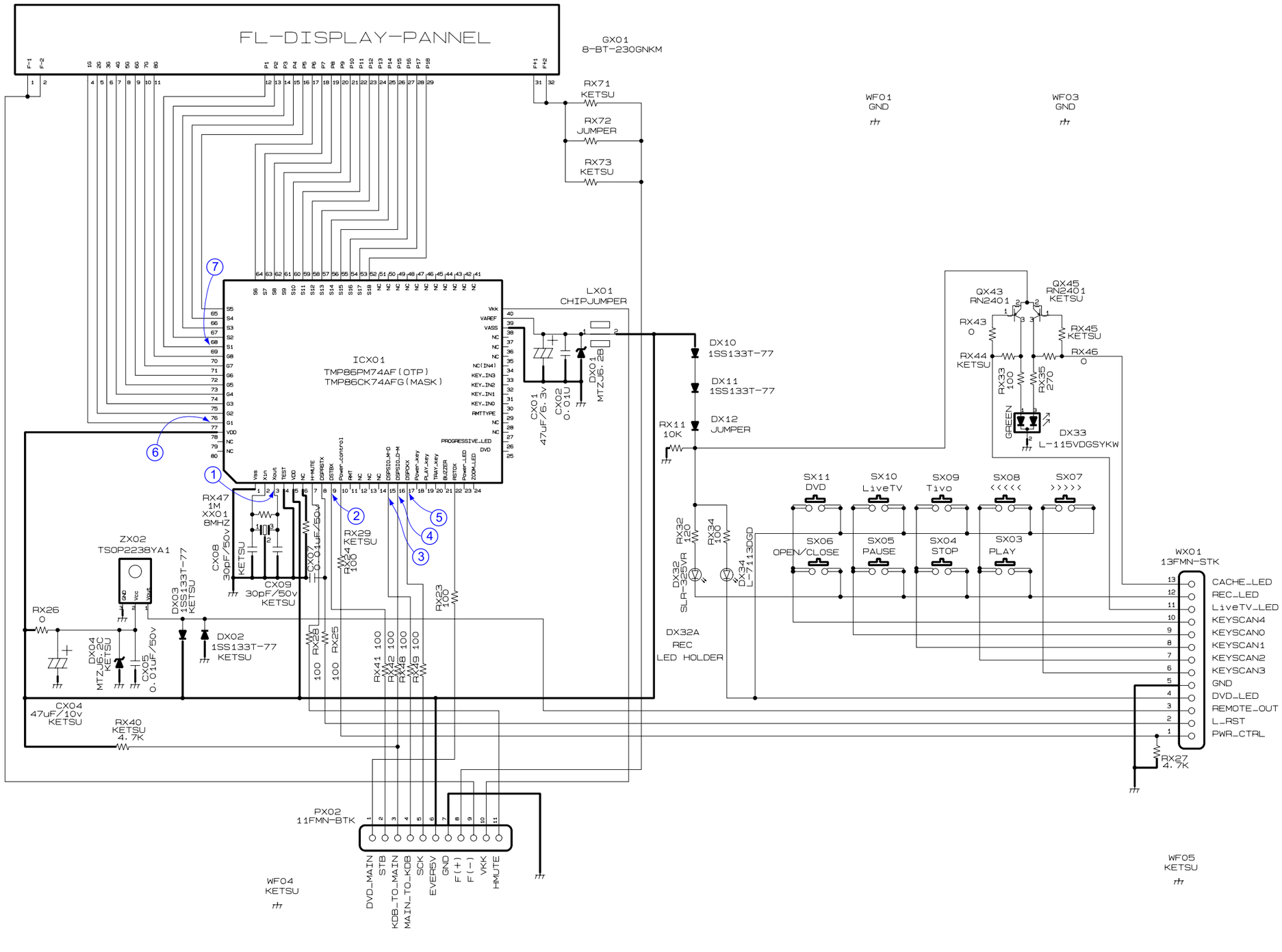
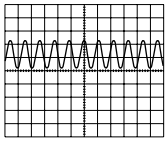


Fig. 3-4-2

Waveform (KDB Front Circuit)

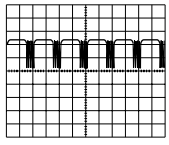
① ICX01, Pin ③ D-3



XOUT

V: 2 V/div
H: 100 ns/div

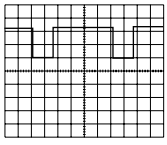
⑤ ICX01, Pin ⑰ E-4



DSPCKX

V: 2 V/div
H: 100 μs/div

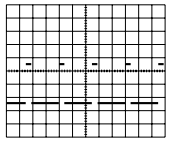
② ICX01, Pin ⑨ E-3



DSTBX

V: 2 V/div
H: 5 ms/div

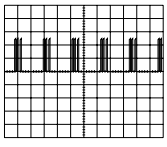
⑥ ICX01, Pin ⑦⑦ D-2



G1

V: 10V/div
H: 500 μs/div

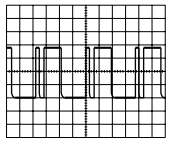
③ ICX01, Pin ⑮ E-4



DSPSIO_M-D

V: 2 V/div
H: 100 μs/div

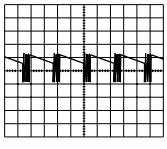
⑦ ICX01, Pin ⑥⑨ C-3



SI

V: 10 V/div
H: 400 μs/div

④ ICX01, Pin ⑯ E-4



DSPSIO_D-M

V: 500 mV/div
H: 100 μs/div

Fig. 3-4-3

4-3. Power Switch Circuit Diagram

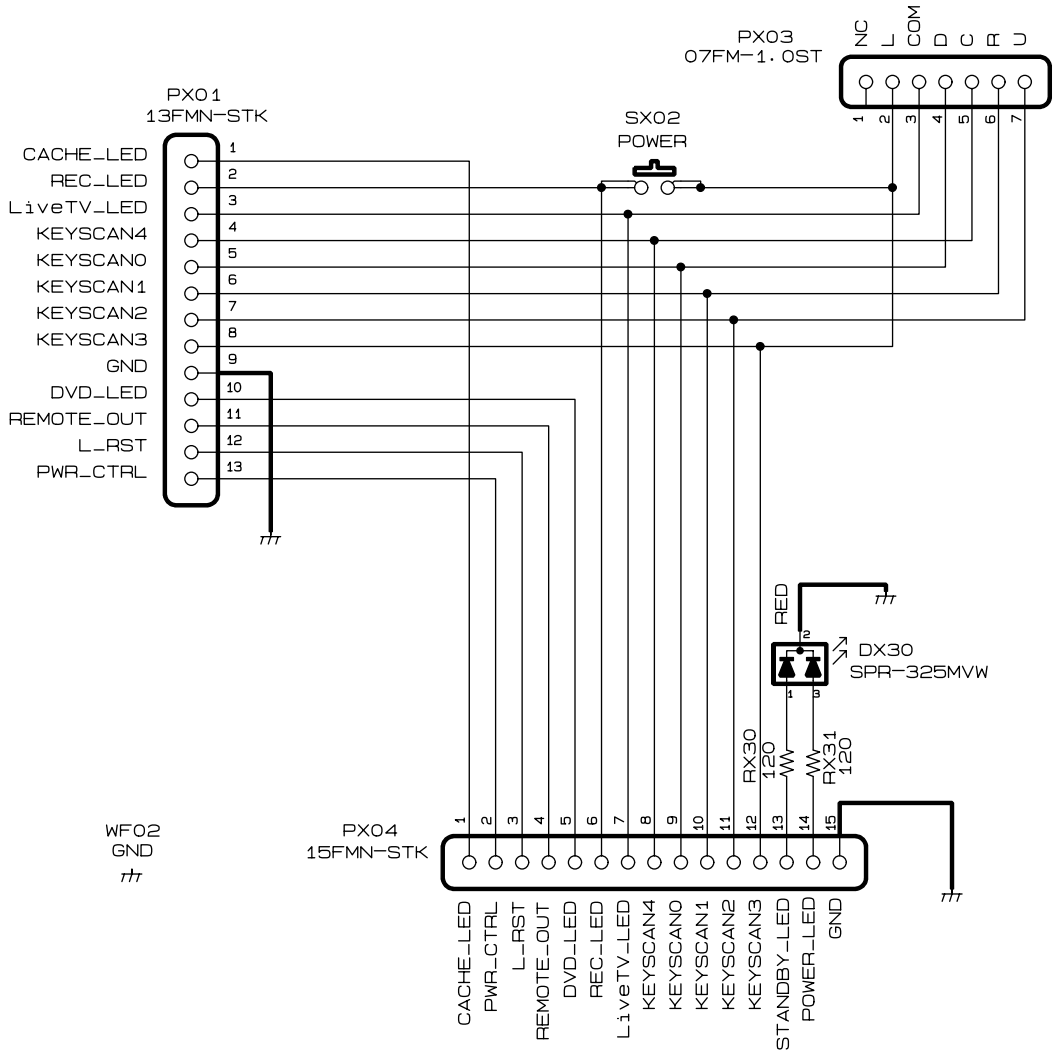


Fig. 3-4-4

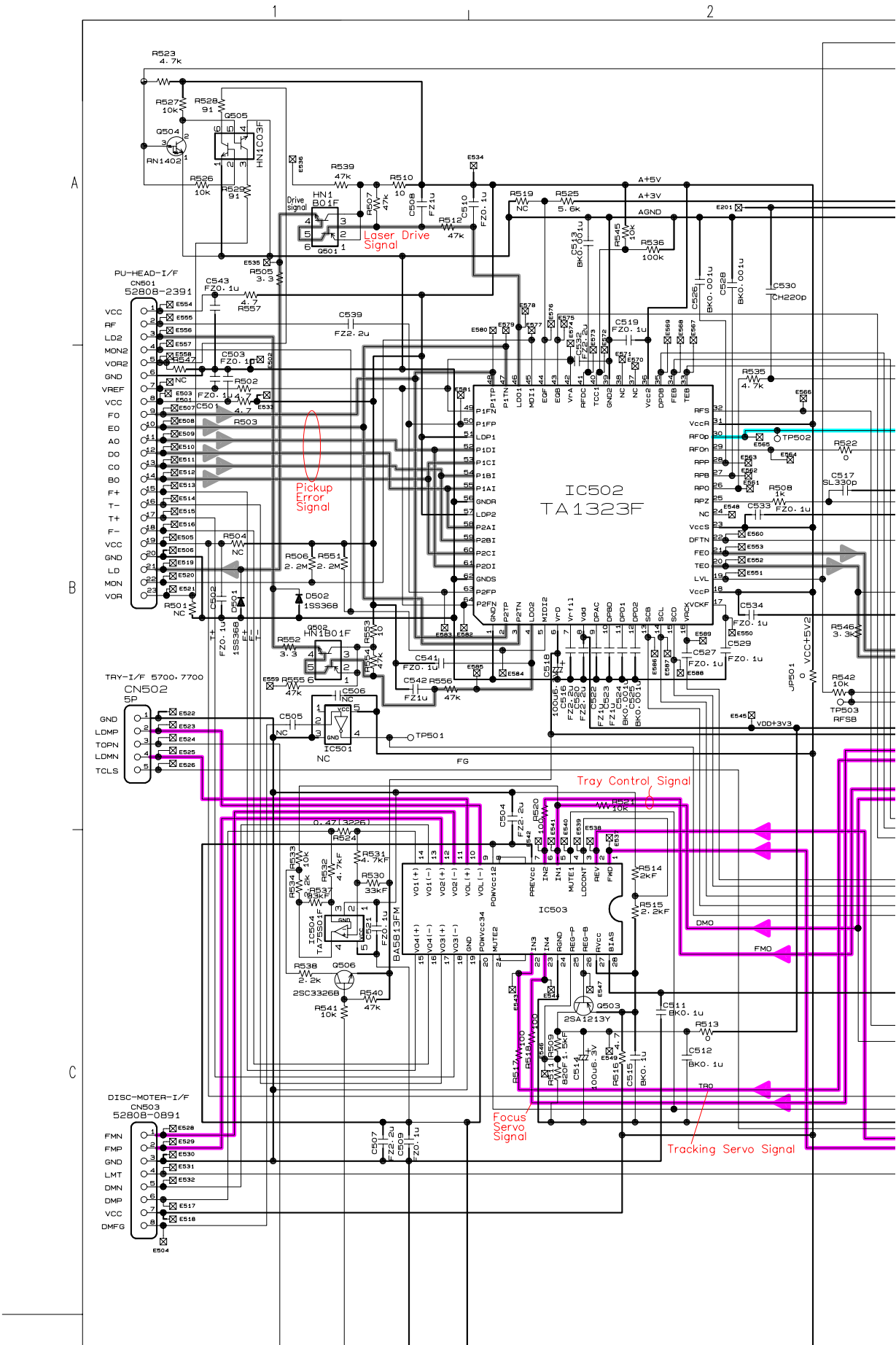
4-4. DVD Main Circuit Diagram

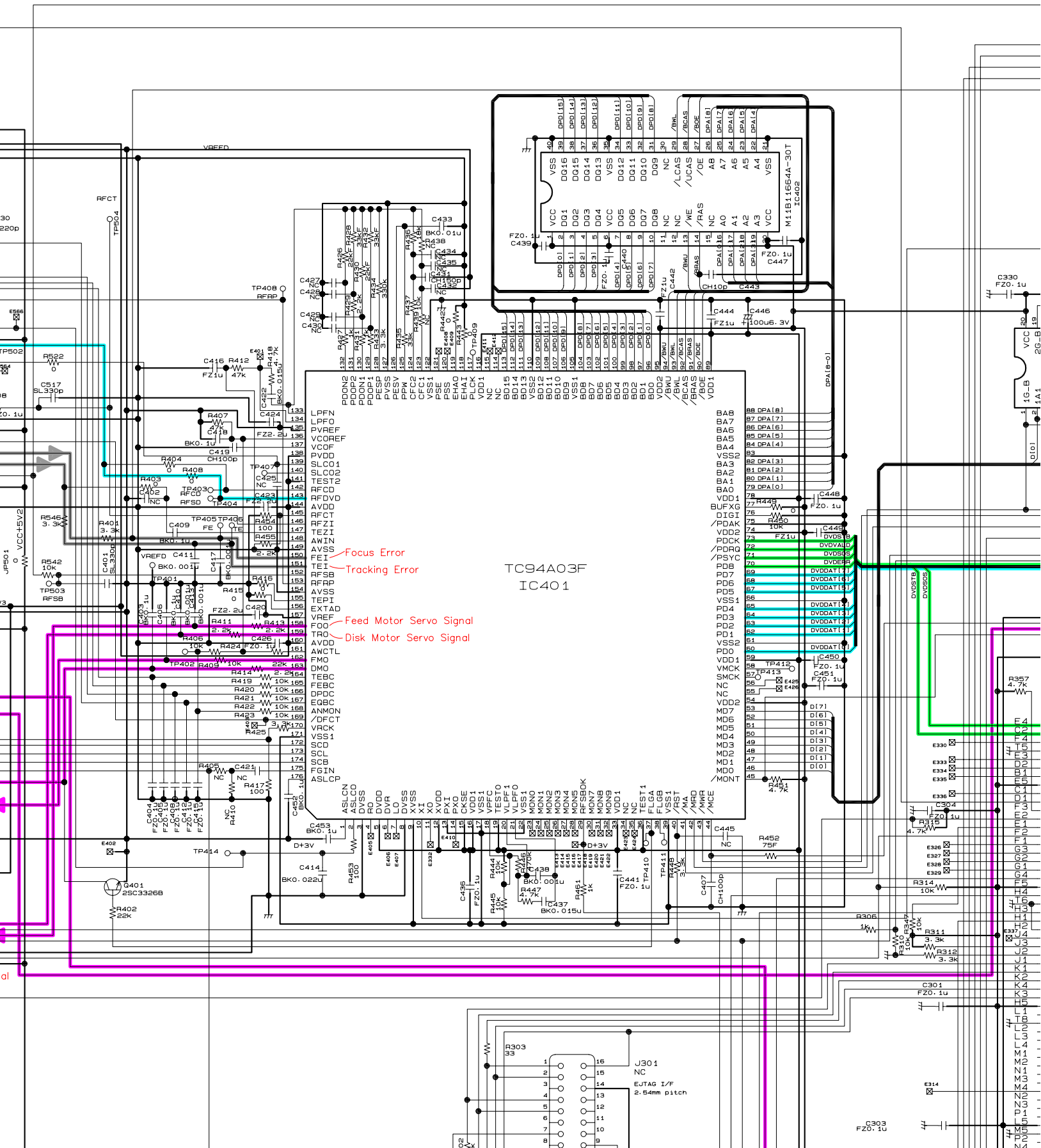
	SD-H400	SD3800	SD4800
CN302	52808-1391	52808-1991	52808-1991
CN901	52808-0791	52808-0791	52808-1591
R324	NC	330	330
R326	NC	330	330
R352	NC	330	330
R353	NC	330	330
R370	NC	330	330
D902	NC	NC	1SS184
D903	NC	NC	1SS184
R913	NC	NC	33
R914	NC	NC	33
R915	NC	NC	33
R916	NC	NC	33
R918	NC	NC	4.7k
R919	NC	NC	4.7k
IC901	NC	NC	TC7SH08FU
C901	NC	NC	FZ0.1u
IC903	NC	NC	PCM1742KE
IC904	NC	NC	PCM1742KE
C904	NC	NC	10u16V
C905	NC	NC	10u16V
C908	NC	NC	10u16V
C909	NC	NC	10u16V
C911	NC	NC	10u16V
C912	NC	NC	10u16V
C922	NC	NC	FZ0.1u
C923	NC	NC	FZ0.1u
C924	NC	NC	FZ0.1u
C925	NC	NC	FZ0.1u
IC308	NC	NC	S24C02AFJ
IC905	NC	NC	MM1575A
C926	NC	NC	FZ0.1u
C927	NC	NC	FZ1u
C928	NC	NC	FZ1u

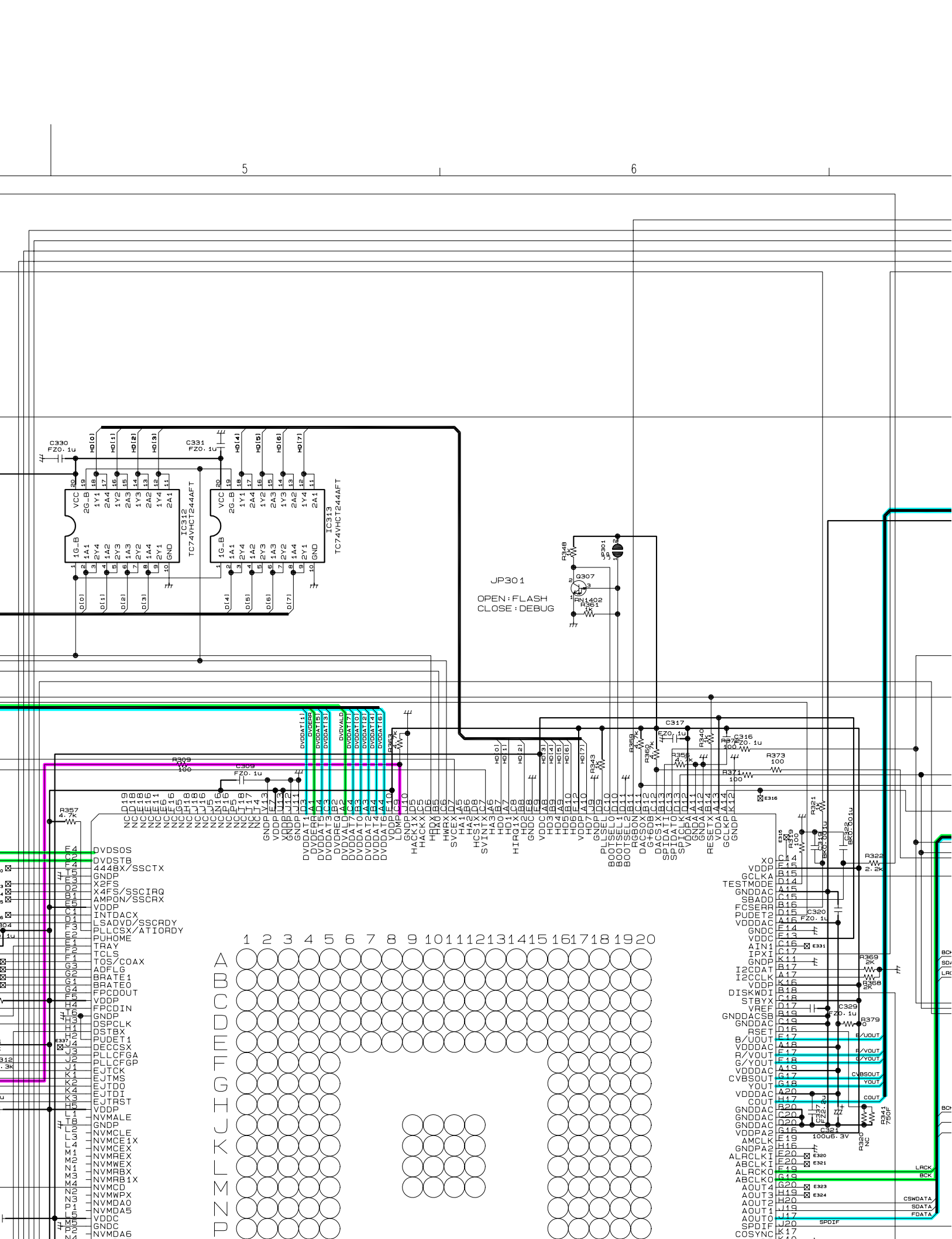
pickup signal
servo control signal
address,system clock
data,video,audio signal

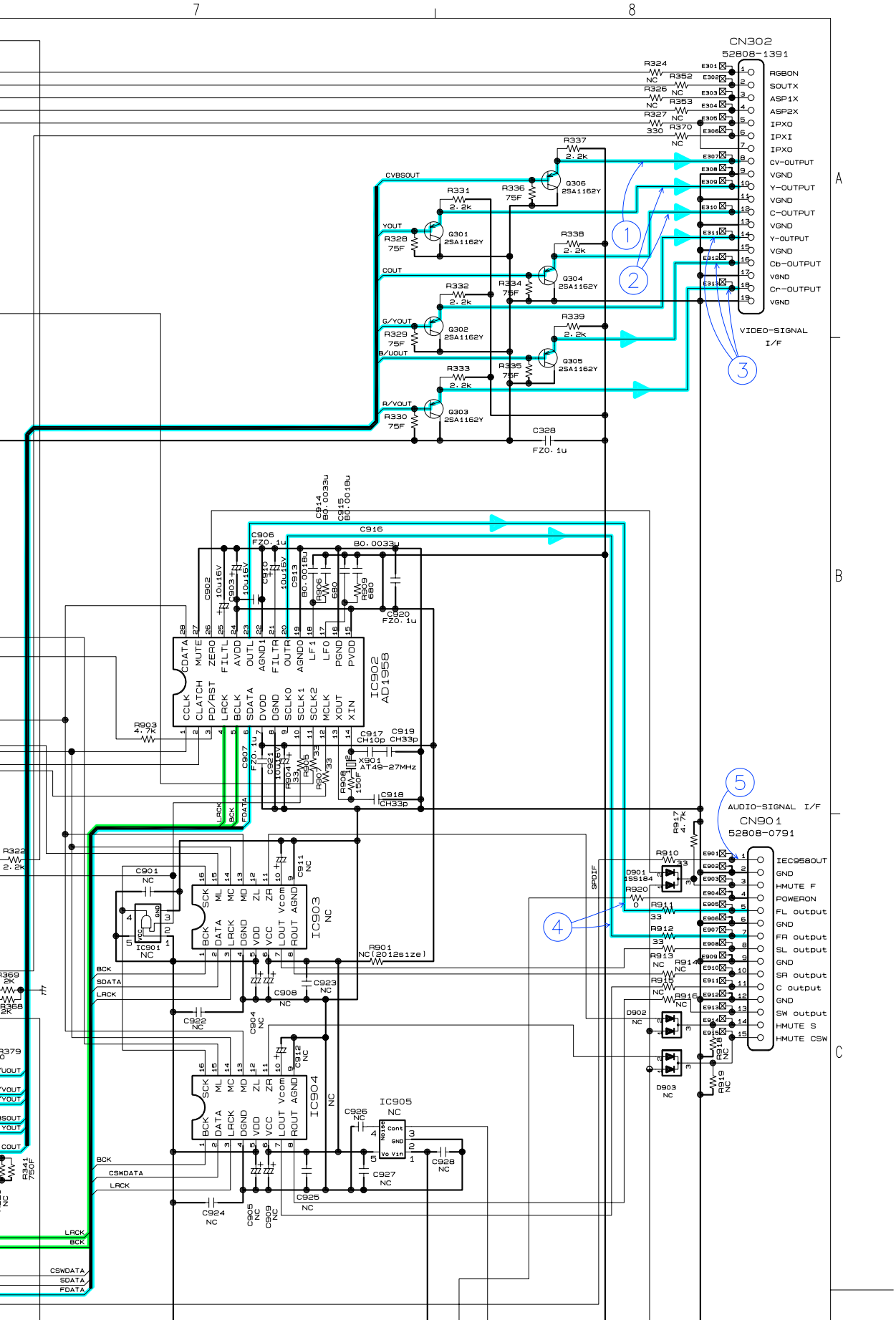
Fig. 3-4-5

4-4. DVD Main Circuit Diagram




TC94A03F
IC401
Focus Error
Tracking Error
Feed Motor Servo Signal
Disk Motor Servo Signal
M11B116644A-30T
IC402
J301
NC
EJTAG I/F
2.54mm pitch
Q401
2SC3326B


5
6
IC312
TC74VHCT244AFT
IC313
TC74VHCT244AFT
JP301
OPEN:FLASH
CLOSE:DEBUG
Q307
RN1402
DVDSOS
DVDSTB
444BX/SSCTX
GNDP
X2FS
X4FS/SSCIRQ
AMPON/SSCRX
VDDP
INTDACX
LSADVD/SSCRDY
PLLCSX/ATIORDY
PUHOME
TRAY
TCLS
TOS/COAX
ADFLG
BRATE1
BRATE0
FPCDOUT
VDDP
FPCDIN
GNDP
DSPCLK
DSTBX
PUDET1
DECCSX
PLLCFGA
PLLCFGP
EJTCK
EJTMS
EJTDO
EJTDI
EJTRST
VDDP
NVMALE
GNDP
NVMCLE
NVMCE1X
NVMCEX
NVMREX
NVMWEX
NVMRBX
NVMRB1X
NVMCD
NVMWPX
NVMDA0
NVMDA5
VDDC
GNDC
NVMDA6
XO
VDDP
GCLKA
TESTMODE
GNDDAC
SBADD
FCSERR
PUDET2
VDDDAC
GNDC
VDDC
AIN1
IPXI
GNDP
I2CDAT
I2CCLK
VDDP
DISKWDI
STBYX
VREF
GNDDACSB
GNDDAC
RSET
B/VOUT
VDDDAC
R/VOUT
G/YOUT
VDDDAC
CVBSOUT
YOUT
VDDDAC
COUT
GNDDAC
GNDDAC
GNDDAC
VDDPA2
AMCLK
GNDPA2
ALRCLKI
ABCLKI
ALRCKO
ABCLKO
AOUT4
AOUT3
AOUT2
AOUT1
AOUT0
SPDIF
COSYNC
LRCK
BCK
CSWDATA
SDATA
FDATA
SPDIF


7
8
A
B
C
CN302
52808-1391
RGBON
SOUTX
ASP1X
ASP2X
IPXO
IPXI
IPXO
CV-OUTPUT
VGND
Y-OUTPUT
VGND
C-OUTPUT
VGND
Y-OUTPUT
VGND
Cb-OUTPUT
VGND
Cr-OUTPUT
VGND
VIDEO-SIGNAL I/F
CVBSOUT
YOUT
COUT
G/YOUT
B/UOUT
R/VOUT
Q301 2SA1162Y
Q302 2SA1162Y
Q303 2SA1162Y
Q304 2SA1162Y
Q305 2SA1162Y
Q306 2SA1162Y
IC902 AD1958
IC903 NC
IC904 NC
IC905 NC
IC901 NC
X901 AT49-27MHz
CN901
52808-0791
IEC958OUT
GND
HMUTE F
POWERON
FL output
GND
FR output
SL output
GND
SR output
C output
GND
SW output
HMUTE S
HMUTE CSW
AUDIO-SIGNAL I/F
D901 1SS184
D902 NC
D903 NC
SPDIF
BCK
SDATA
LRCK
CSWDATA
FDATA

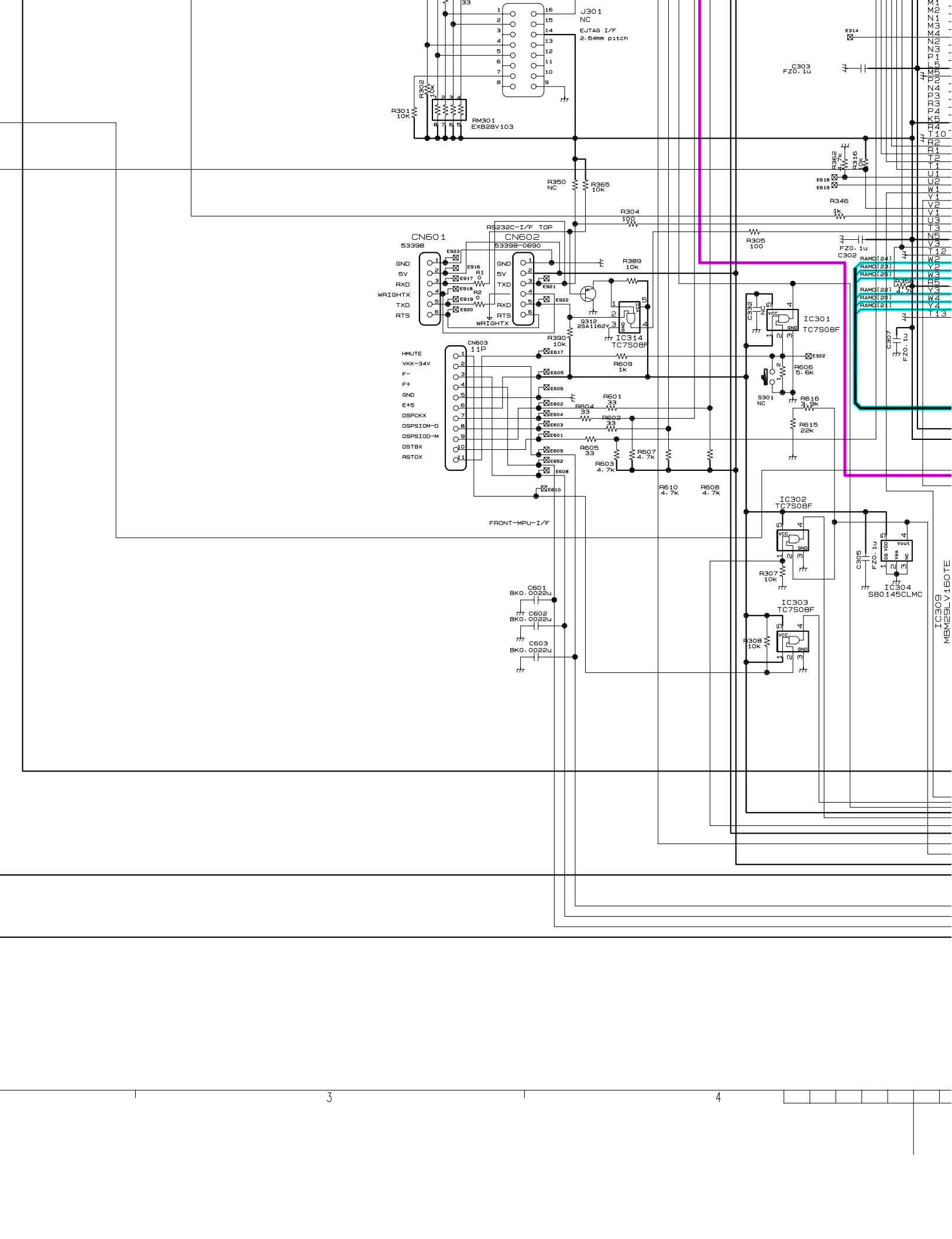
	SD-H400	SD3800	SD4800
CN302	52808-1391	52808-1991	52808-1991
CN901	52808-0791	52808-0791	52808-1591
R324	NC	330	330
R326	NC	330	330
R352	NC	330	330
R353	NC	330	330
R370	NC	330	330
D902	NC	NC	1SS184
D903	NC	NC	1SS184
R913	NC	NC	33
R914	NC	NC	33
R915	NC	NC	33
R916	NC	NC	33
R918	NC	NC	4.7k
R919	NC	NC	4.7k
IC901	NC	NC	TC7SH08FU
C901	NC	NC	FZ0.1u
IC903	NC	NC	PCM1742KE
IC904	NC	NC	PCM1742KE
C904	NC	NC	10u16V
C905	NC	NC	10u16V
C908	NC	NC	10u16V
C909	NC	NC	10u16V
C911	NC	NC	10u16V
C912	NC	NC	10u16V
C922	NC	NC	FZ0.1u
C923	NC	NC	FZ0.1u
C924	NC	NC	FZ0.1u
C925	NC	NC	FZ0.1u
IC308	NC	NC	S24C02AFJ
IC905	NC	NC	MM1575A
C926	NC	NC	FZ0.1u
C927	NC	NC	FZ1u
C928	NC	NC	FZ1u

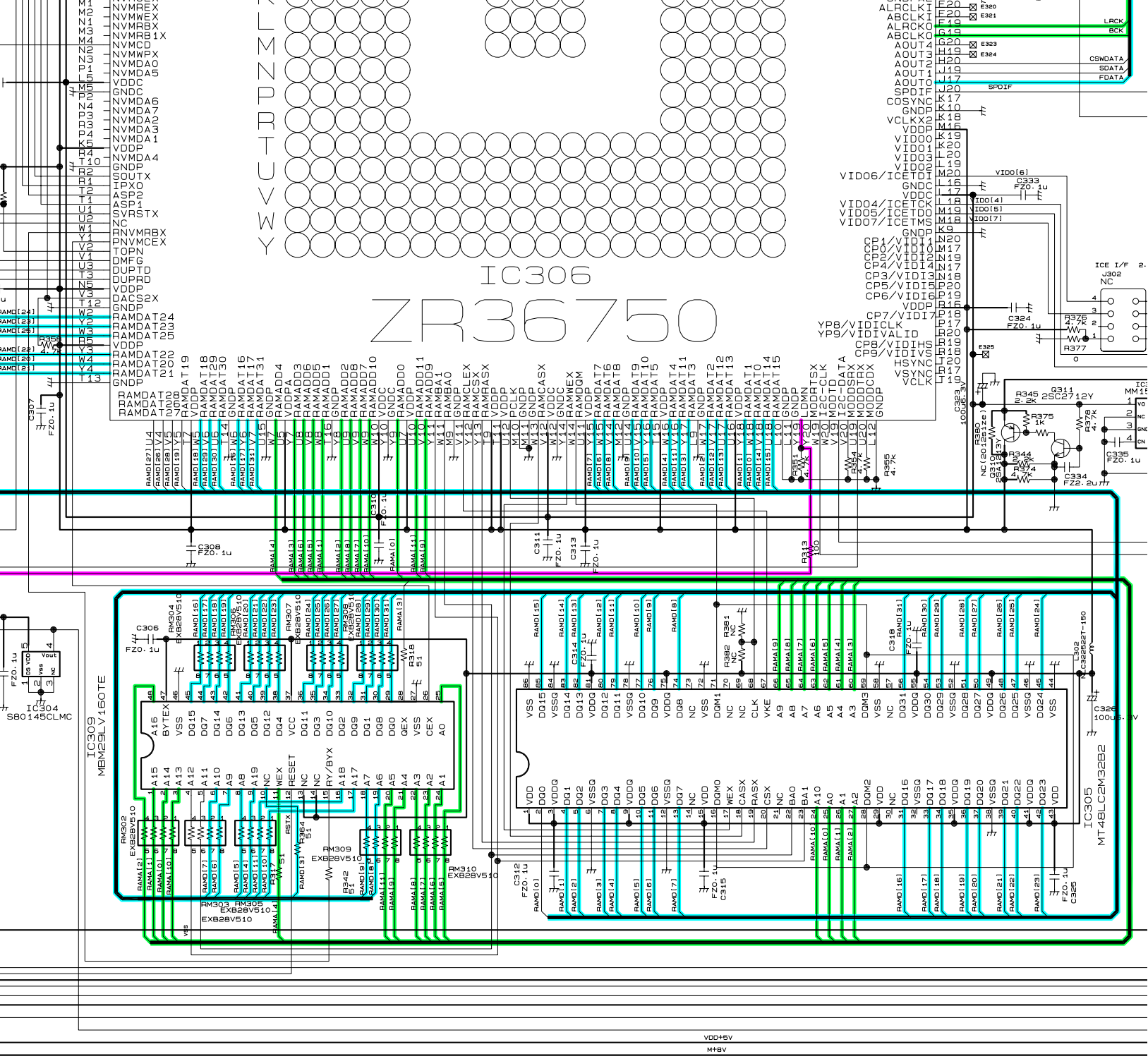
pickup signal

servo control signal

address,system clock

data,video,audio signal


J301
NC
EJTAG I/F
2.54mm pitch
R301
10K
R302
10K
RM301
EXB28V103
R350
NC
R365
10k
R304
100
R305
100
C303
FZ0.1u
C302
FZ0.1u
R362
4.7k
R346
0
R346
1k
CN601
53398
CN602
53398-0690
RS232C-I/F TOP
GND
5V
RXD
WRIGHTX
TXD
RTS
R1
0
R2
0
R389
10k
Q312
2SA1162Y
IC314
TC7S08F
R390
10K
CN603
11P
HMUTE
VKK-34V
F-
F+
GND
E+5
DSPCKX
DSPSIOM-D
DSPSIOD-M
DSTBX
RSTOX
R609
1k
R601
33
R604
33
R602
33
R605
33
R603
4.7k
R607
4.7k
R610
4.7k
R608
4.7k
FRONT-MPU-I/F
IC301
TC7S08F
C332
C307
FZ0.1u
S301
NC
R606
5.6k
R616
3.3k
R615
22k
IC302
TC7S08F
R307
10k
C305
FZ0.1u
IC304
S80145CLMC
IC303
TC7S08F
R308
10k
C601
BK0.0022u
C602
BK0.0022u
C603
BK0.0022u
IC309
MBM29LV160TE
RAMD[24]
RAMD[23]
RAMD[25]
RAMD[22]
RAMD[20]
RAMD[21]


IC306
ZR36750
IC309
M68M29LV160TE
IC305
MT48LC2M32B2
IC304
SB0145CLMC
J302
NC
ICE I/F 2.
VDD+5V
M+8V

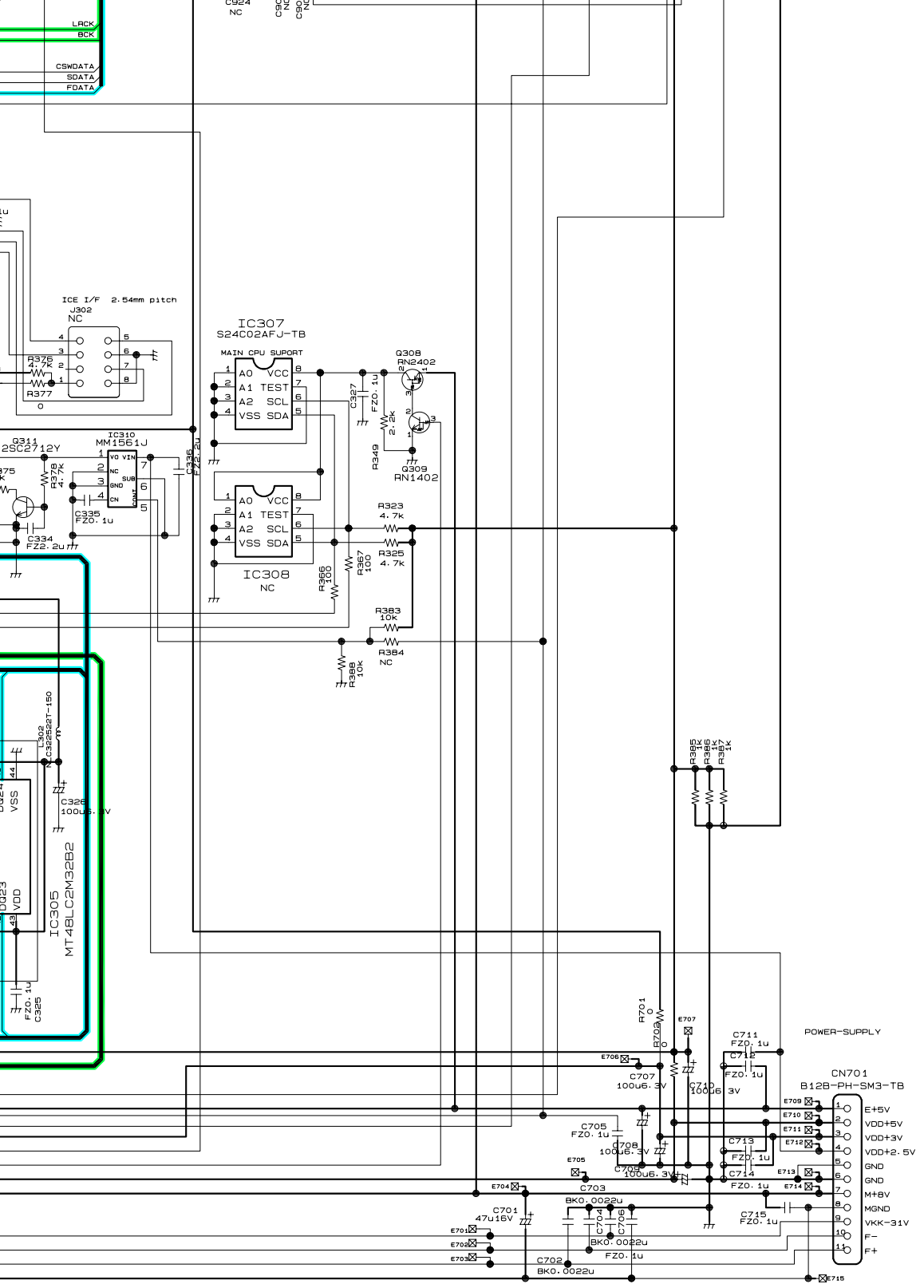

LRCK
BCK
CSWDATA
SDATA
FDATA
ICE I/F 2.54mm pitch
J302
NC
IC307
S24C02AFJ-TB
MAIN CPU SUPORT
A0 VCC
A1 TEST
A2 SCL
VSS SDA
IC308
NC
Q308
RN2402
Q309
RN1402
IC310
MM1561J
Q311
2SC2712Y
IC305
MT48LC2M32B2
CN701
B12B-PH-SM3-TB
POWER-SUPPLY
E+5V
VDD+5V
VDD+3V
VDD+2.5V
GND
GND
M+8V
MGND
VKK-31V
F-
F+

Fig. 3-4-5

Waveform (DVD Main Circuit)

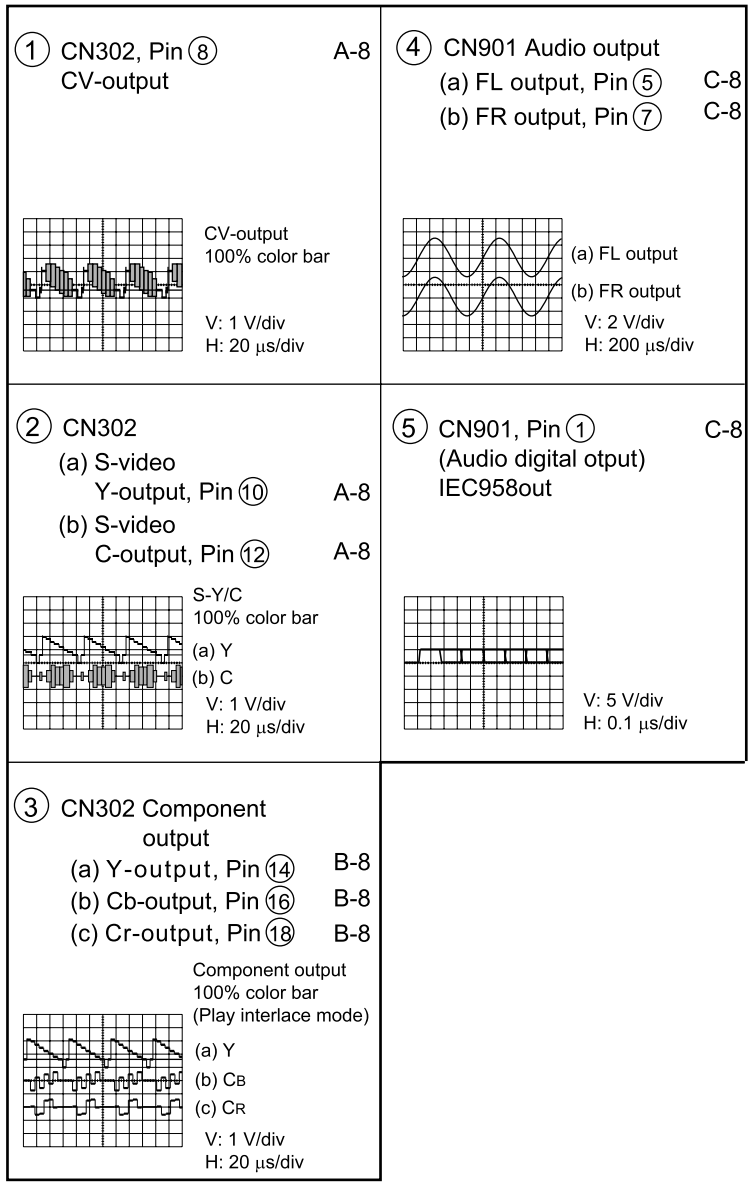


Fig. 3-4-6

4-5. Tivo Main Circuit Diagram

DESIGN NOTES-01

NOTES:

1 - All resistor and ceramic capacitor sizes are 0603 unless otherwise noted in the schematics and BOM.

2 - Resistor tolerances are 5% unless other noted in schematics and BOM.

3 - All caps are 50V, X7R dielectric unless other noted in schematics and BOM.

4 - All nets without off page references are connected to other location on the same page.

VIDEO INPUT MUX AND FILTER-05

(Removed)

ANALOG TUNER REGION-07

THE ANALOG TUNER GROUND SECTION IS ISOLATED IN THE FAB.

3.3V DIGITAL REGION-07

ANALOG REGION

THE ANALOG GROUND SECTION IS ISOLATED IN THE FAB.

Tuner and Analog grounds tied at Mounting Screw 1

MTS STEREO DECODER & ADC-07

MIPS CPU-09

SYSTEM POWER CONNECTOR-03

(Modified portion)

SYSTEM CLOCKS-04

(Modified portion)

SYSTEM RESET-04

A/V INPUT RCA JACKS-18

(Modified portion)

S-VIDEO INPUT CONNECTOR-18

(Modified portion)

BOARD MOUNTING HOLES-18

ANALOG VIDEO REGION-06

(Modified portion)

3.3V DIGITAL REGION-06

VISION TECH MPEG2 A/V ENCODER AND ENCODER MEMORY-08

VTCH_SA12A

BCM7020 SYSTEM CONTROLLER-10

USB HOST CONTROLLER || USB POWER-15

USB CONNS-18

IR-14

HDD TO DVD INTERFACE -14

(Modified portion)

MEDIA SWITCH ASIC-12

SERIAL_TIMEKEEPER-13

CAUTION:
Danger of explosive if battery is incorrectly replaced.
Replace only with the same or equivalent type.

VIDEO OUTPUT BUFFER/FILTER-17

(Modified portion)

A/V OUTPUT RCA JACKS-18

(Modified portion)

S-VIDEO OUT-18

RS232 TRANCEIVER-14

MODEM-16

ENCRYPTED IDE CONNECTOR-14

FLASH MEMORY-13

TEMP SENSOR-13

PWM FAN CONTROL-13

SYSTEM MEMORY-11

BCM7020 BYPASS

SECURITY MICRCO-14

(Modified portion)

DSS/IR CONN-18

BOARD REV
Rev B= 0x4c or 0x7c

MLB_A[2:0]

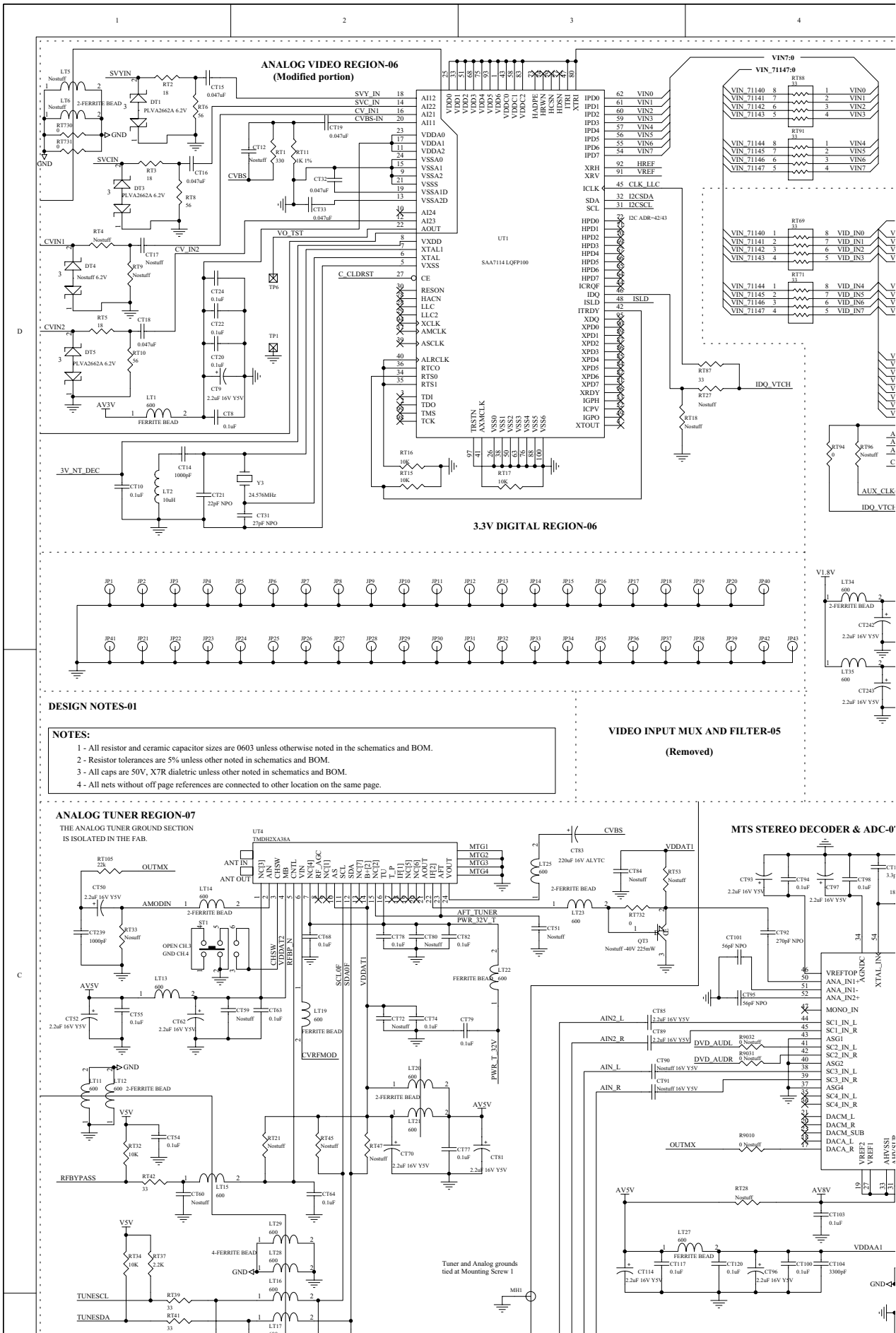
MLB_D[15:0]

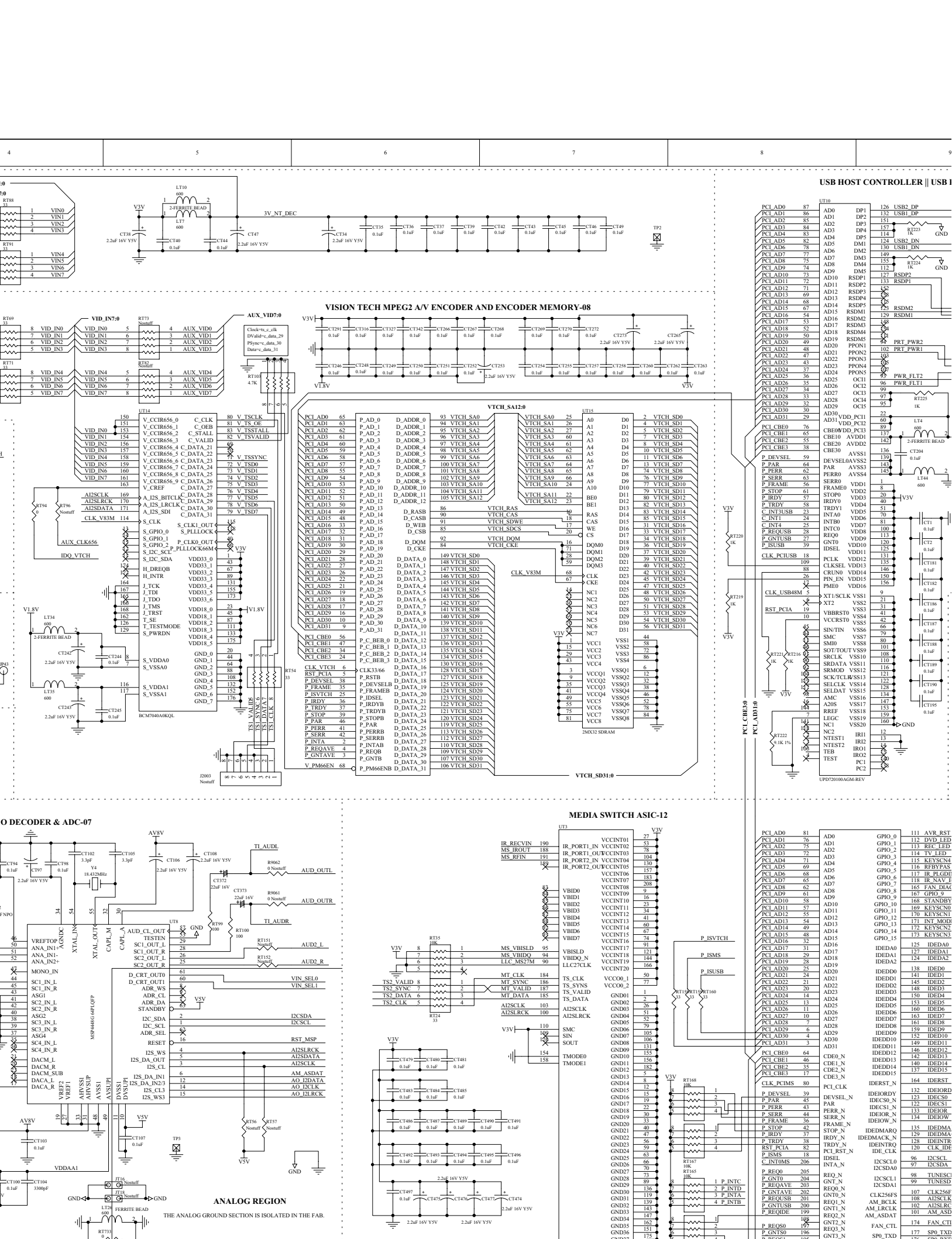
NO. AFTER TITLE	DESCRIPTION
xxx-01	TOP LEVEL || DESIGN NOTES
xxx-02	PX UART || AUDIO BUFFER & SWITCH(Modified)
xxx-03	SYSTEM POWER(Modified)
xxx-04	SYSTEM CLOCK || RESET
xxx-05	VIDEO INPUT MUX AND FILTERS(Removed)
xxx-06	NTSC VIDEO DECODER
xxx-07	TUNER || AUDIO STEREO DECORDER & ADC
xxx-08	MPEG2 A/V ENCODER || ENCODER MEMORY
xxx-09	MIPS CPU
xxx-10	BC7020 SYSTEM CONNECTOR
xxx-11	SYSTEM MEMORY
xxx-12	MEDIA SWITCH ASIC
xxx-13	FLASH || THERMAL MGMT || RTC
xxx-14	IDE || IR || SECURE MICRO || RS232 XCVR(Modified)
xxx-15	USB HOST CONTROLLER || USB POWER
xxx-16	MODEM
xxx-17	VIDEO OUTPUT BUFFER/FILTER(Modified)
xxx-18	A/V TO || SERIAL & IR || USB CONNECTOR

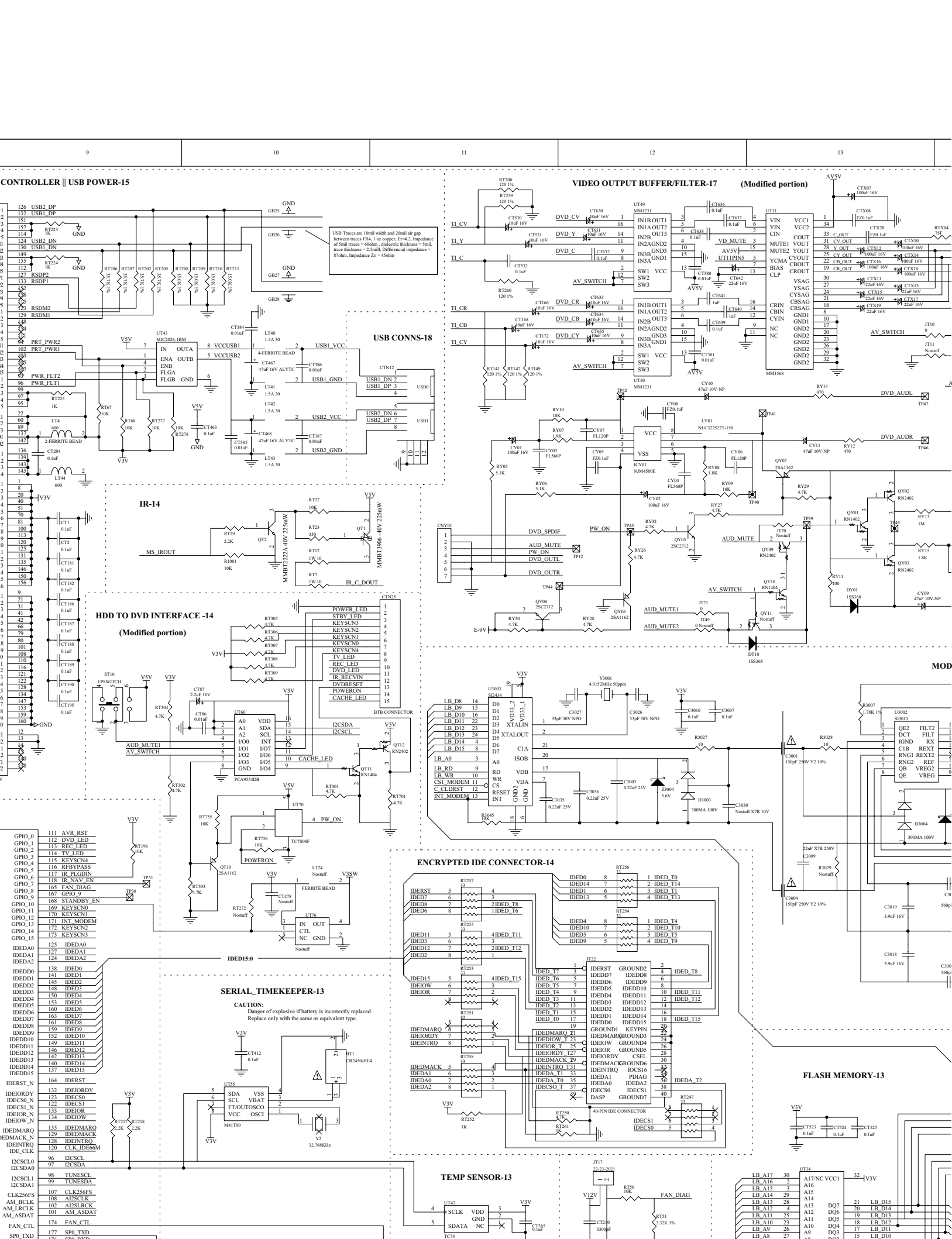
BOARD	REV	DESCRIPTION
P0	A1	INITIAL RELEASE.
P1	B1	- REMOVE: ALT POWER CONNECTOR, CONEXANT MODEM, USB 1.1 CONTROLLER, ATL CLOCK CHIP - MODIFIED ANALOG VIDEO INPUT CIRCUIT - STUFF USB 2.0 CONTROLLER - STRAP CPU FOR 162 MHz - MOVE CLOCK CHIP AND REGULATORS TO TOP SIDE - ADD FOOTPRINTS FOR ATSC TUNER SUPPORT
P2.0	C1	- FIX 656 INTERFACE CONNECTIONS TO 7020 - ADD PCI CONNECTOR - ADD FOOTPRINT FOR NEW SECURE MICRO - ADD LIGHTNING PROTECTION CIRCUIT TO MODEM - ADD FOOTPRINT FOR LED CURRENT LIMITING - ADD ESD SPARK GAPS TO USB - ROTATE ATSC TUNER FOOTPRINT
P2.1	D1	- SHRINK BOARD OUTLINE BY 1 INCH - REMOVE ATSC TUNER FOOTPRINTS - ADD RESISTOR FOOTPRINT TO MODEM FOR CALL WAITING FIX - IMPROVE LAYOUT/ROUTING FOR TESTABILITY
P2.2	E1	- CHANGE CONNECTOR MOUNTING FEATHERS FROM HOLES TO RECTANGULES FOR J7 AND J48

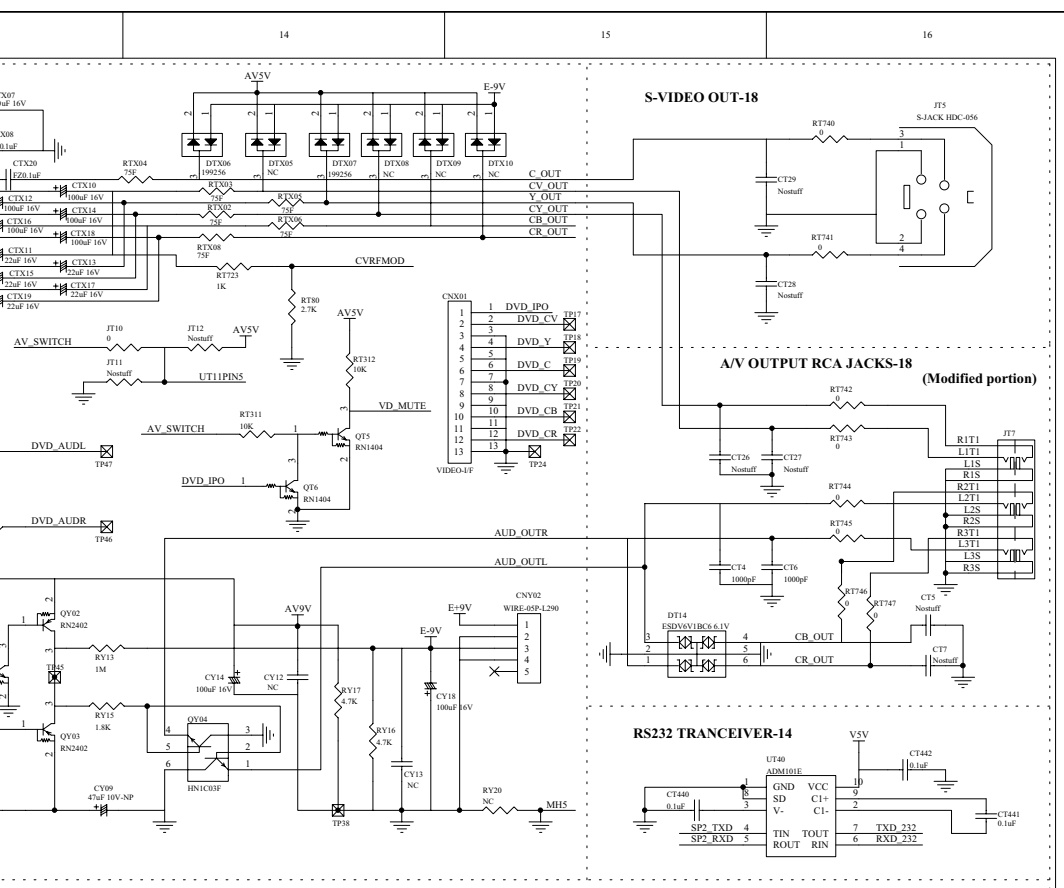
Fig. 3-4-7

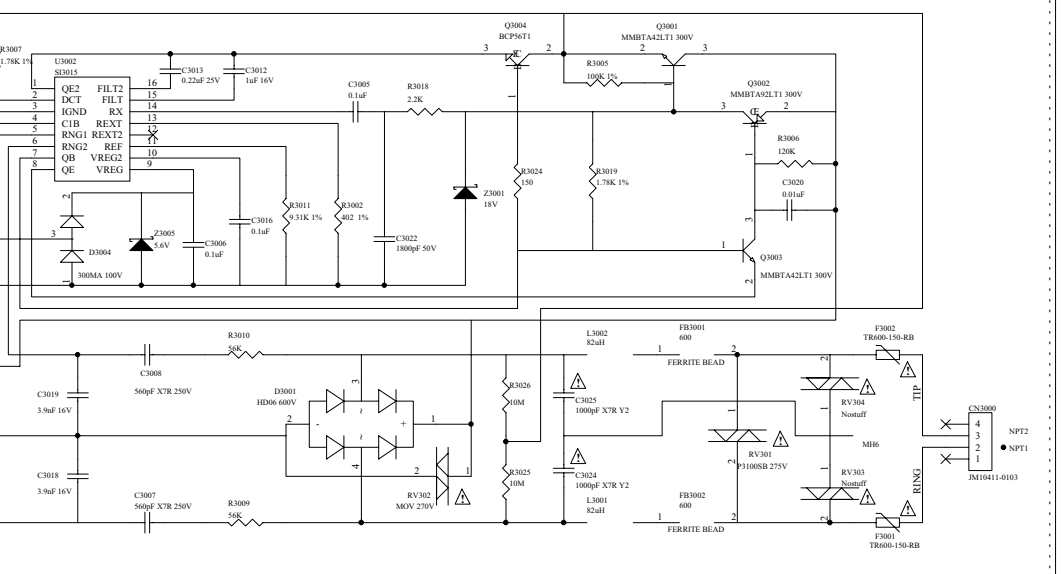
4-5. Tivo Main Circuit Diagram

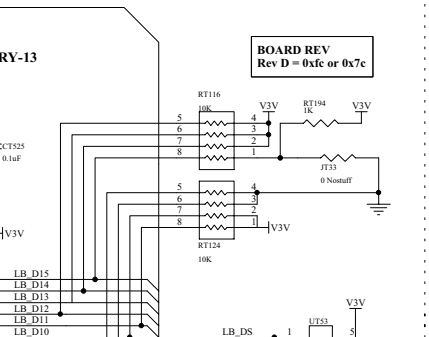


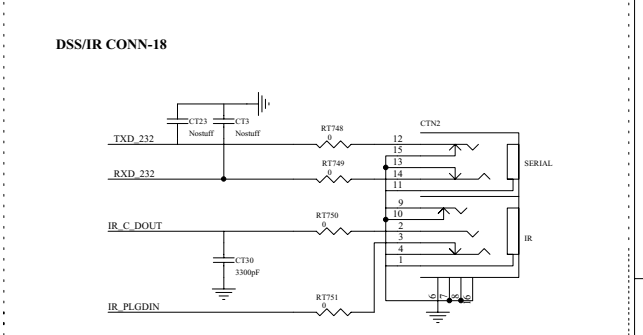

USB HOST CONTROLLER || USB
VISION TECH MPEG2 A/V ENCODER AND ENCODER MEMORY-08
MEDIA SWITCH ASIC-12
O DECODER & ADC-07
ANALOG REGION
THE ANALOG GROUND SECTION IS ISOLATED FROM THE FAB.
VID_IN7:0
AUX_VID7:0
VTCH_SA12:0
VTCH_SD31:0
BCM7040A0KQL
2MX32 SDRAM
UPD720100AGM-REV
MS9448G 64PLQFP
PCI_CBE3:0
PCI_AD31:0
3V_NT_DEC
2-FERRITE BEAD
AUD_OUTL
AUD_OUTR
AUD2_L
AUD2_R
TI_AUDL
TI_AUDR
I2CSDA
I2CSCL
RST_MSP
FERRITE BEAD

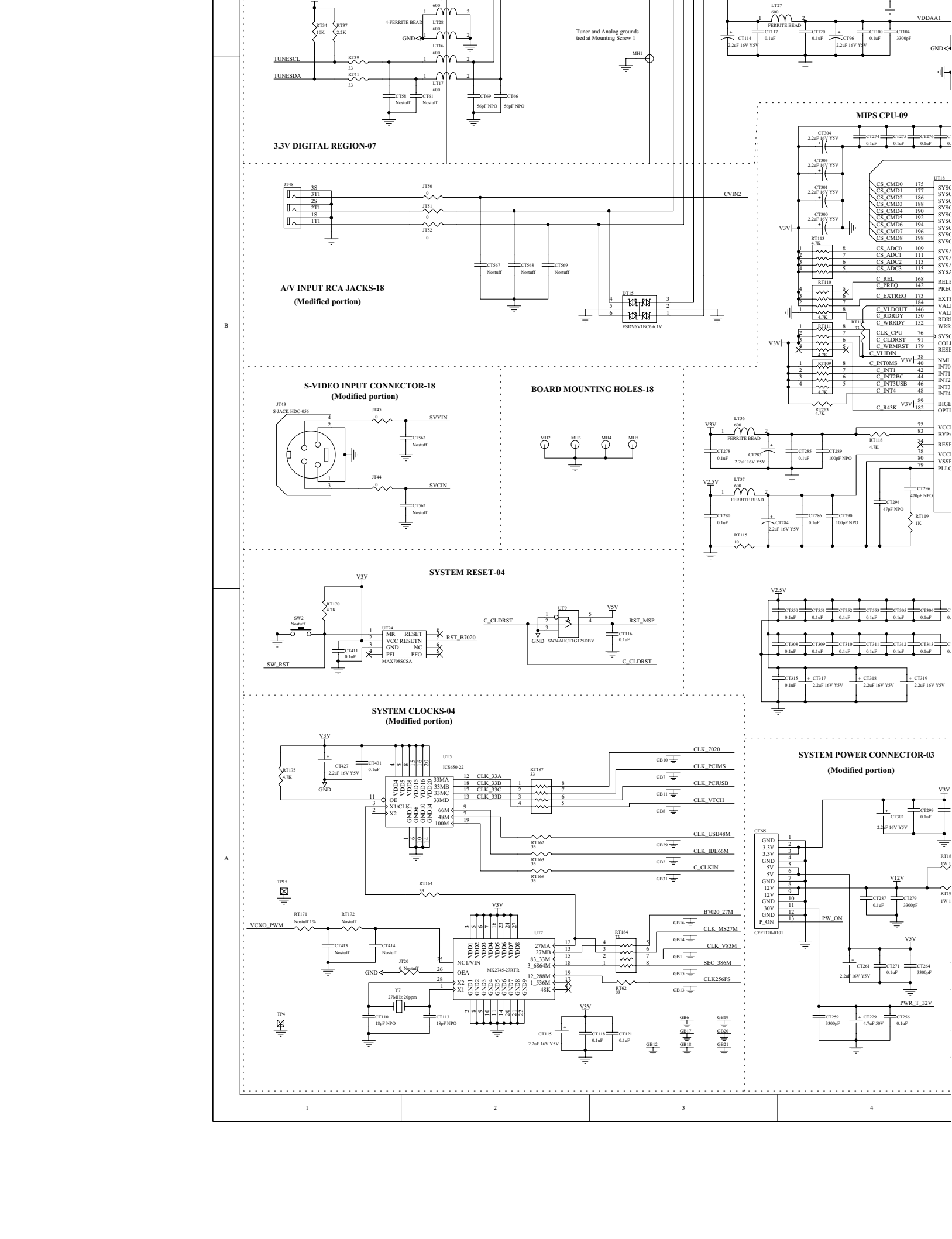

9
10
11
12
13
CONTROLLER || USB POWER-15
USB CONNS-18
VIDEO OUTPUT BUFFER/FILTER-17
(Modified portion)
IR-14
HDD TO DVD INTERFACE -14
(Modified portion)
ENCRYPTED IDE CONNECTOR-14
SERIAL_TIMEKEEPER-13
CAUTION:
Danger of explosive if battery is incorrectly replaced.
Replace only with the same or equivalent type.
TEMP SENSOR-13
FLASH MEMORY-13
MOD
USB Traces are 10mil width and 20mil air gap between traces FR4, 1 oz copper, Er=4.2, Impedance of 5mil traces = 60ohm , dielectric thickness = 5mil, trace thickness = 2.5mil, Differencial impedance = 87ohm, Impedance Zo = 45ohm
IDED15:0
40-PIN IDE CONNECTOR
BTB CONNECTOR
PCA9554DB
M41T00
MM1568
MM1231
NJM4580E
NLC322522T-150
SI2434
SI3015
MMBT2222A 40V 225mW
MMBT3906 -40V 225mW
TC7S08F
2-FERRITE BEAD
4-FERRITE BEAD
FERRITE BEAD
32.768KHz
CR2450-HE4
300MA 100V
Nostuff X7R 10V
150pF 250V Y2 10%
22nF X7R 250V
33pF 50V NPO
3.9nF 16V
560pF
AV5V
V5V
V3V
V3SW
GND
TP40
TP41
TP42
TP43
TP44
TP46
TP47
TP31
TP30

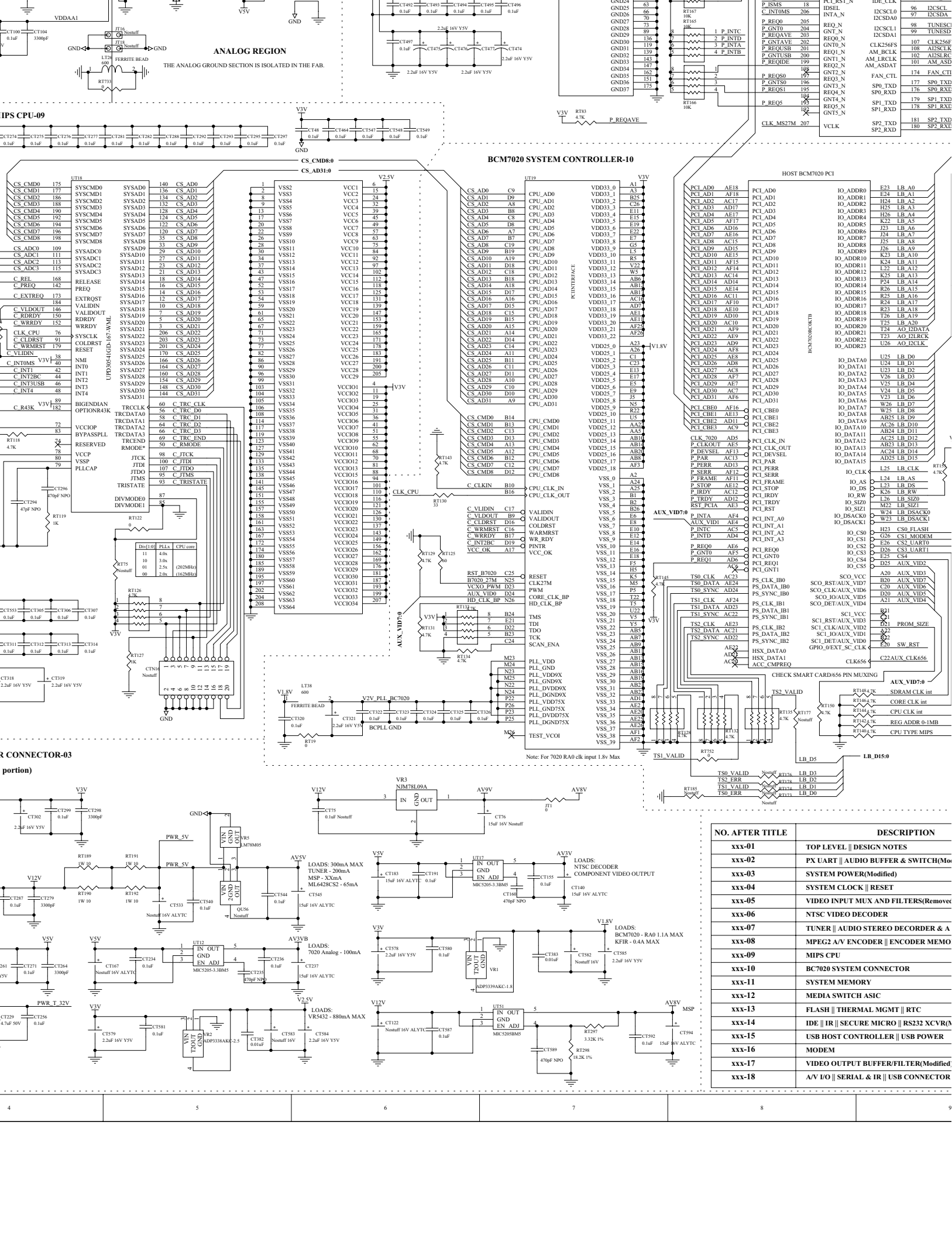

AV5V
E-9V
S-VIDEO OUT-18
JT5
S-JACK HDC-056
C_OUT
CV_OUT
Y_OUT
CY_OUT
CB_OUT
CR_OUT
CVRFMOD
AV_SWITCH
VD_MUTE
UT11PIN5
DVD_AUDL
DVD_AUDR
DVD_IPO
AUD_OUTR
AUD_OUTL
CNX01
VIDEO-I/F
DVD_IPO
DVD_CV
DVD_Y
DVD_C
DVD_CY
DVD_CB
DVD_CR
A/V OUTPUT RCA JACKS-18
(Modified portion)
R1T1
L1T1
L1S
R1S
R2T1
L2T1
L2S
R2S
R3T1
L3T1
L3S
R3S
AV9V
E+9V
CNY02
WIRE-05P-L290
CB_OUT
CR_OUT
RS232 TRANCEIVER-14
UT40
ADM101E
GND
VCC
SD
C1+
V-
C1-
TIN
TOUT
ROUT
RIN
SP2_TXD
SP2_RXD
TXD_232
RXD_232
V5V
MH5


MODEM-16
U3002
SI3015
QE2
DCT
IGND
C1B
RNG1
RNG2
QB
QE
FILT2
FILT
RX
REXT
REXT2
REF
VREG2
VREG
Q3004
BCP56T1
Q3001
MMBTA42LT1 300V
Q3002
MMBTA92LT1 300V
Q3003
MMBTA42LT1 300V
Z3001
18V
Z3005
5.6V
D3004
300MA 100V
D3001
HD06 600V
RV302
MOV 270V
RV304
Nostuff
RV301
P3100SB 275V
RV303
Nostuff
FB3001
600
FB3002
600
FERRITE BEAD
F3002
TR600-150-RB
F3001
TR600-150-RB
CN3000
JM10411-0103
NPT2
NPT1
TIP
RING
MH6
L3002
82uH
L3001
82uH

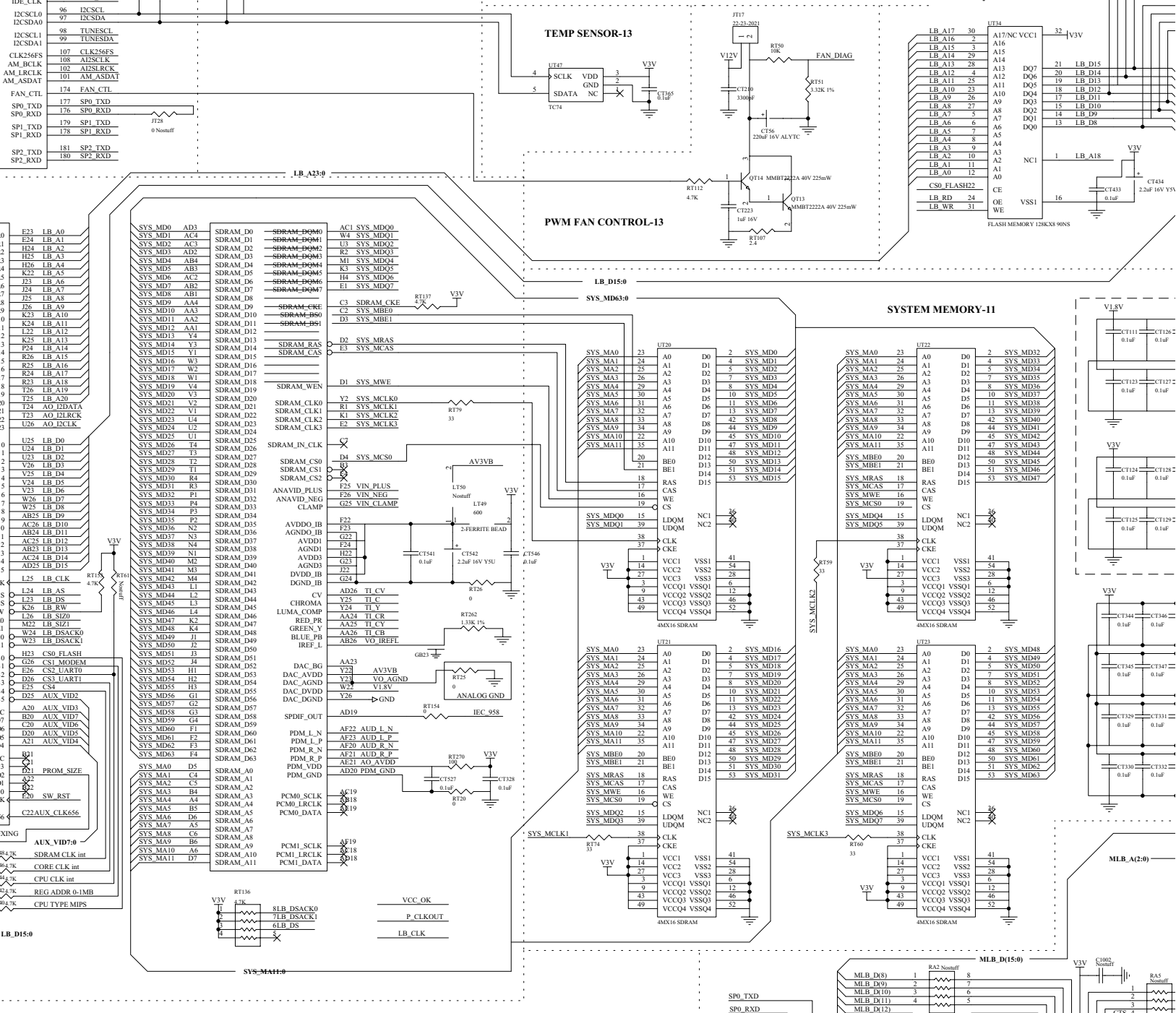

RY-13
BOARD REV
Rev D = 0xfc or 0x7c
V3V
LB_D15
LB_D14
LB_D13
LB_D12
LB_D11
LB_D10
LB_DS


DSS/IR CONN-18
TXD_232
RXD_232
IR_C_DOUT
IR_PLGDIN
CTN2
SERIAL
IR
CT30
3300pF


3.3V DIGITAL REGION-07
A/V INPUT RCA JACKS-18
(Modified portion)
MIPS CPU-09
S-VIDEO INPUT CONNECTOR-18
(Modified portion)
BOARD MOUNTING HOLES-18
SYSTEM RESET-04
SYSTEM CLOCKS-04
(Modified portion)
SYSTEM POWER CONNECTOR-03
(Modified portion)
Tuner and Analog grounds
tied at Mounting Screw 1
CVIN2
SVYIN
SVCIN
RST_B7020
SW_RST
C_CLDRST
RST_MSP
CLK_7020
CLK_PCIMS
CLK_PCIUSB
CLK_VTCH
CLK_USB48M
CLK_IDE66M
C_CLKIN
B7020_27M
CLK_MS27M
CLK_V83M
SEC_386M
CLK256FS
PW_ON
PWR_T_32V
VDDAA1
TUNESCL
TUNESDA
VCXO_PWM



NO. AFTER TITLE	DESCRIPTION
xxx-01	TOP LEVEL || DESIGN NOTES
xxx-02	PX UART || AUDIO BUFFER & SWITCH(Mod
xxx-03	SYSTEM POWER(Modified)
xxx-04	SYSTEM CLOCK || RESET
xxx-05	VIDEO INPUT MUX AND FILTERS(Removed
xxx-06	NTSC VIDEO DECODER
xxx-07	TUNER || AUDIO STEREO DECORDER & A
xxx-08	MPEG2 A/V ENCODER || ENCODER MEMO
xxx-09	MIPS CPU
xxx-10	BC7020 SYSTEM CONNECTOR
xxx-11	SYSTEM MEMORY
xxx-12	MEDIA SWITCH ASIC
xxx-13	FLASH || THERMAL MGMT || RTC
xxx-14	IDE || IR || SECURE MICRO || RS232 XCVR(M
xxx-15	USB HOST CONTROLLER || USB POWER
xxx-16	MODEM
xxx-17	VIDEO OUTPUT BUFFER/FILTER(Modified)
xxx-18	A/V I/O || SERIAL & IR || USB CONNECTOR



DESCRIPTION
SIGN NOTES
O BUFFER & SWITCH(Modified)
(Modified)
|| RESET
UX AND FILTERS(Removed)
CODER
STEREO DECORDER & ADC
ODER || ENCODER MEMORY
CONNECTOR
RY
ASIC
IAL MGMT || RTC
RE MICRO || RS232 XCVR(Modified)
TROLLER || USB POWER
BUFFER/FILTER(Modified)
& IR || USB CONNECTOR

BOARD	REV	DESCRIPTION
P0	A1	INITIAL RELEASE.
P1	B1	- REMOVE: ALT POWER CONNECTOR, CONEXANT MODEM, USB 1.1 CONTROLLER, ATL CLOCK CHIP - MODIFIED ANALOG VIDEO INPUT CIRCUIT - STUFF USB 2.0 CONTROLLER - STRAP CPU FOR 162 MHz - MOVE CLOCK CHIP AND REGULATORS TO TOP SIDE - ADD FOOTPRINTS FOR ATSC TUNER SUPPORT
P2.0	C1	- FIX 656 INTERFACE CONNECTIONS TO 7020 - REMOVE PCI CONNECTOR - ADD FOOTPRINT FOR NEW SECURE MICRO - ADD LIGHTNING PROTECTION CIRCUIT TO MODEM - ADD FOOTPRINT FOR LED CURRENT LIMITING - ADD ESD SPARK GAPS TO USB - ROTATE ATSC TUNER FOOTPRINT
P2.1	D1	- SHRINK BOARD OUTLINE BY 1 INCH - REMOVE ATSC TUNER FOOTPRINTS - ADD RESISTOR FOOTPRINT TO MODEM FOR CALL WAITING FIX - IMPROVE LAYOUT/ROUTING FOR TESTABILITY
P2.2	E1	- CHANGE CONNECTOR MOUNTING FEATHERS FROM HOLES TO RECTANGLES FOR J7 AND J48

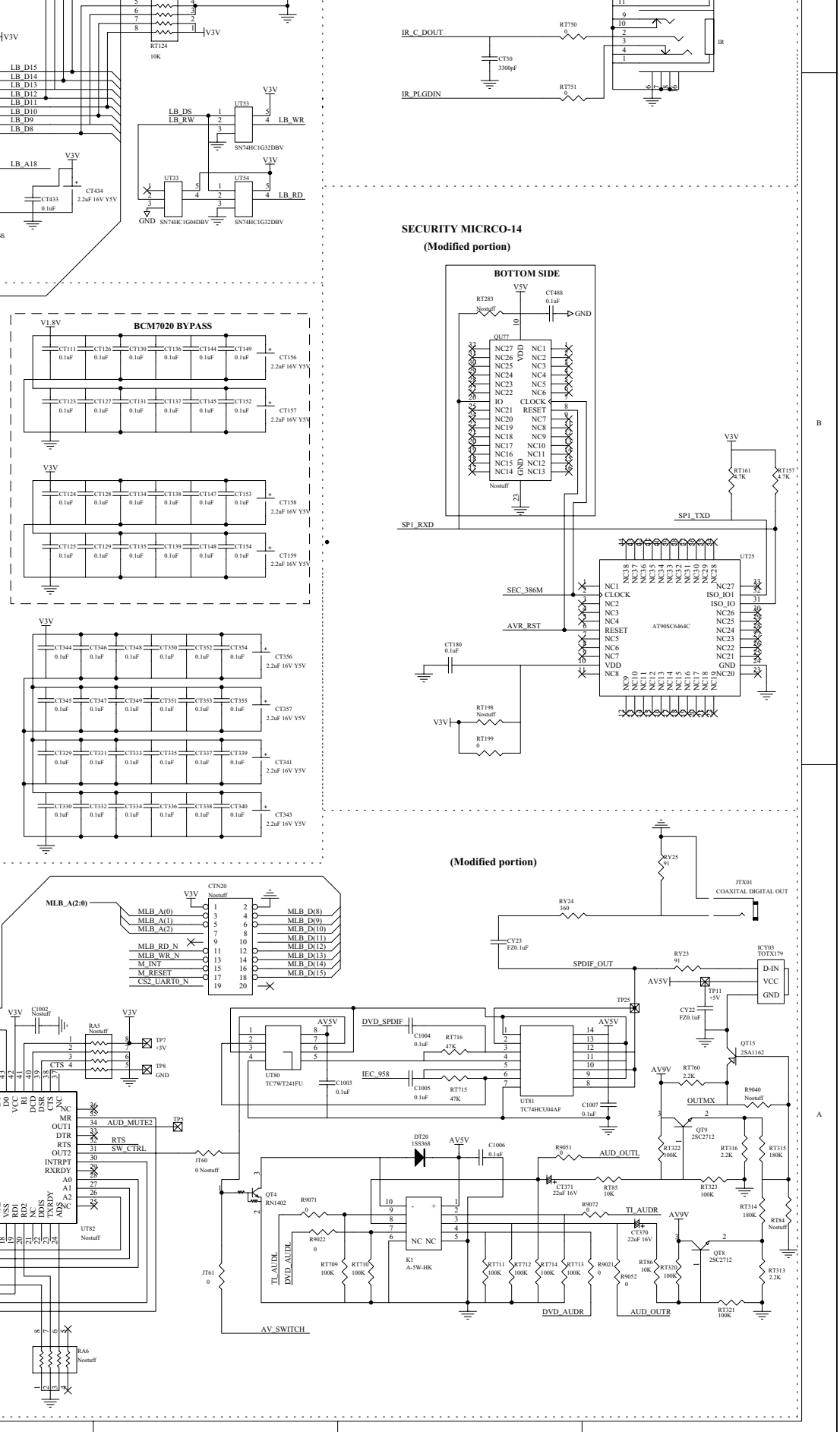

BCM7020 BYPASS
SECURITY MICRCO-14
(Modified portion)
BOTTOM SIDE
(Modified portion)
IR_C_DOUT
IR_PLGDIN
LB_D15
LB_D14
LB_D13
LB_D12
LB_D11
LB_D10
LB_D9
LB_D8
LB_A18
LB_DS
LB_RW
LB_WR
LB_RD
SN74HC1G32DBV
SN74HC1G04DBV
SP1_RXD
SP1_TXD
SEC_386M
AVR_RST
AT90SC6464C
MLB_A(2:0)
MLB_A(0)
MLB_A(1)
MLB_A(2)
MLB_RD_N
MLB_WR_N
M_INT
M_RESET
CS2_UART0_N
MLB_D(8)
MLB_D(9)
MLB_D(10)
MLB_D(11)
MLB_D(12)
MLB_D(13)
MLB_D(14)
MLB_D(15)
COAXITAL DIGITAL OUT
SPDIF_OUT
TOTX179
DVD_SPDIF
IEC_958
TC7WT241FU
TC74HCU04AF
AUD_MUTE2
RTS
SW_CTRL
AUD_OUTL
AUD_OUTR
TI_AUDR
DVD_AUDR
TI_AUDL
DVD_AUDL
AV_SWITCH
AV5V
AV9V
V5V
V3V
V1.8V
GND
OUTMX
QT15 2SA1162
QT9 2SC2712
QT8 2SC2712
QT4 RN1402
DT20 1SS368
K1 A-5W-HK
UT80
UT81
UT82
UT33
UT53
UT54
UT25
QU77

Fig. 3-4-7

5. PC BOARD

5-1. Power Switch PC Board

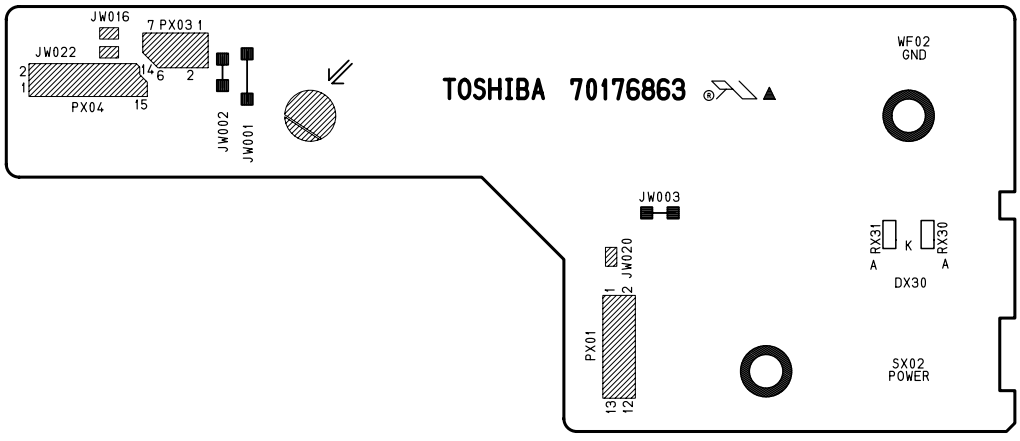


Fig. 3-5-1
UX03 Power Switch PC Board
(Top side)

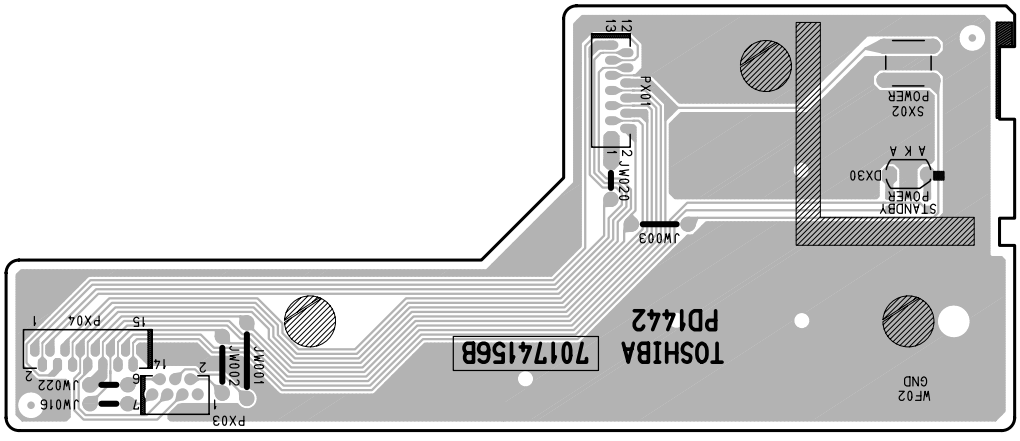


Fig. 3-5-2
UX03 Power Switch PC Board
(Bottom side)

5-2. KDB Front PC Board

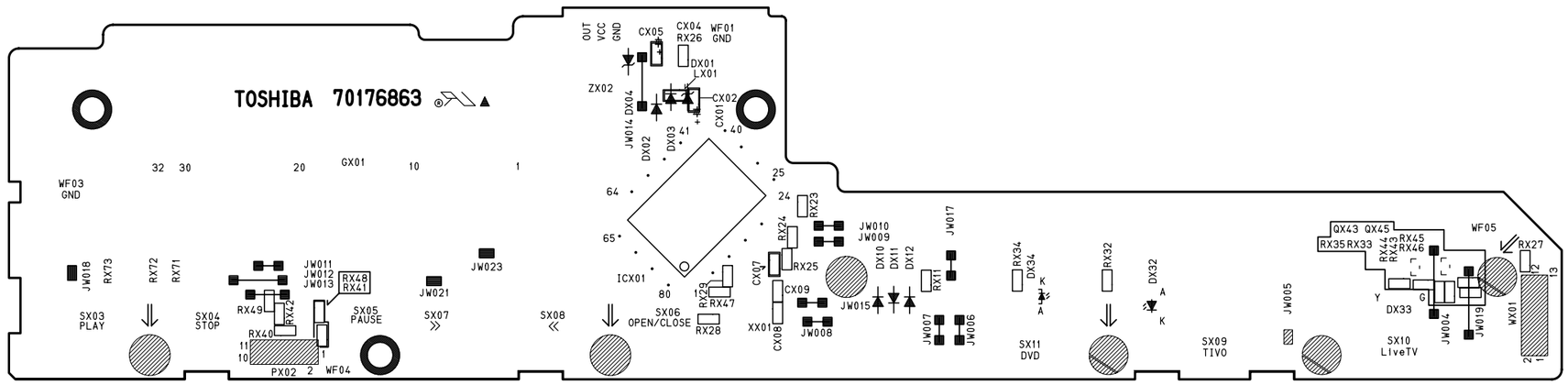


Fig. 3-5-3 UX02 KDB Front PC Board (Top side)

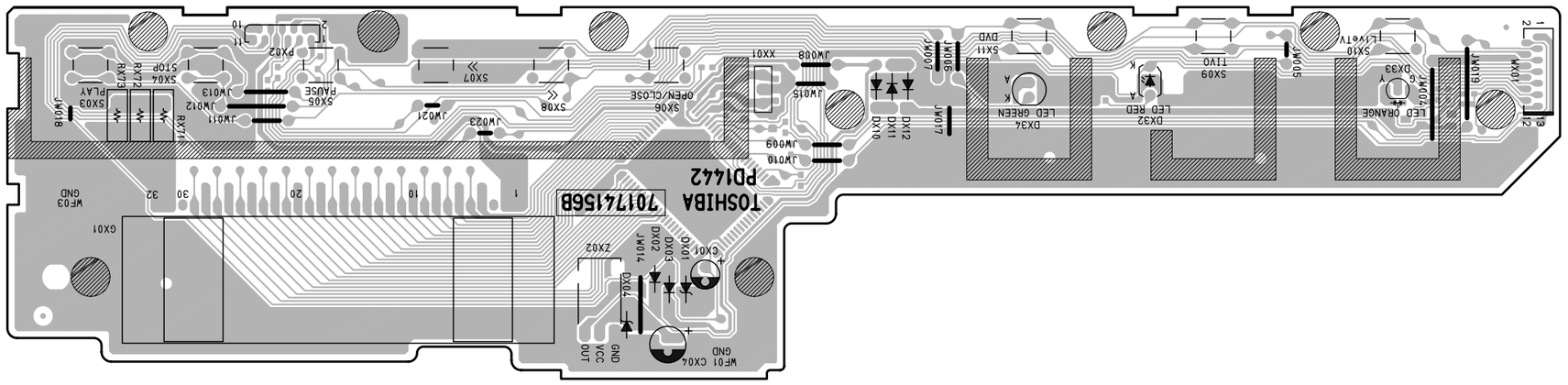


Fig. 3-5-4 UX02 KDB Front PC Board (Bottom side)

A

B

C

D

E

F

G

5-3. DVD Main PC Board

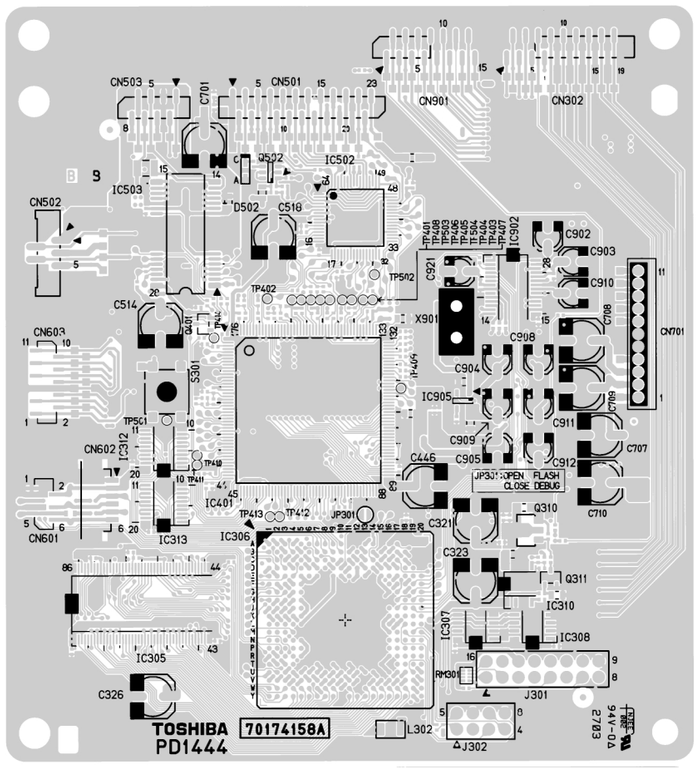


Fig. 3-5-5 UD01 DVD Main PC Board (Top side)

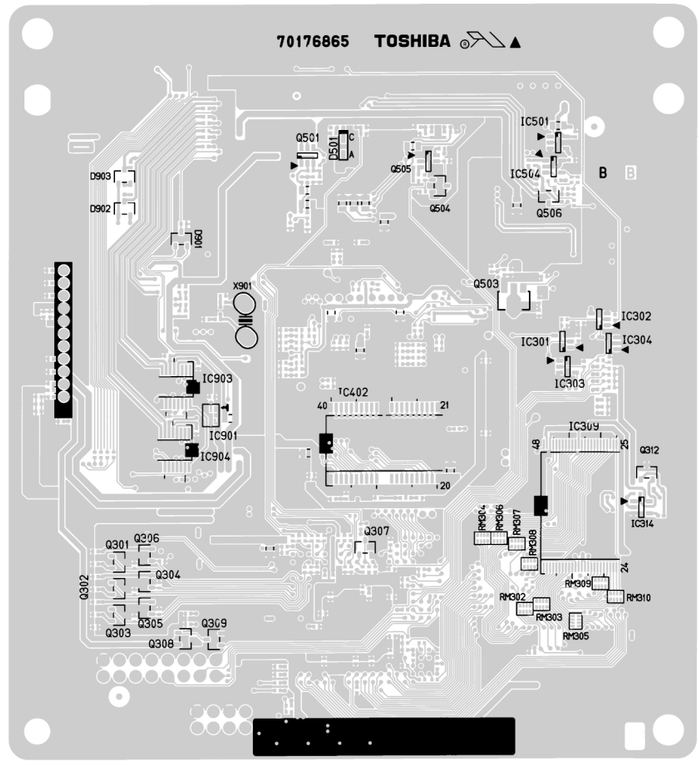


Fig. 3-5-6 UD01 DVD Main (Bottom side)

SECTION 4
PARTS LIST

SAFETY PRECAUTION

The parts identified by ! (⚠) mark are critical for safety. Replace only with part number specified.

The mounting position of replacement is to be identical with originals.

The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.

ABBREVIATIONS

(1) Integrated Circuit (IC)

(2) Capacitor (Cap)

- **Capacitance Tolerance (for Nominal Capacitance more than 10pF)**

Table 4-2-1

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+ 100 0	+ 30 – 10	+ 50 – 10	+ 75 – 10	+ 20 – 10	+ 100 – 10	+ 40 – 20	+ 150 – 10	+ 80 – 20

Ex. 10MF J = 10μF ± 5%

- **Capacitance Tolerance (for Nominal Capacitance 10pF or less)**

Table 4-2-2

Symbol	B	C	D	F	G
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10pF G = 10pF ± 2pF

(3) Resistor (Res)

- **Resistance tolerance**

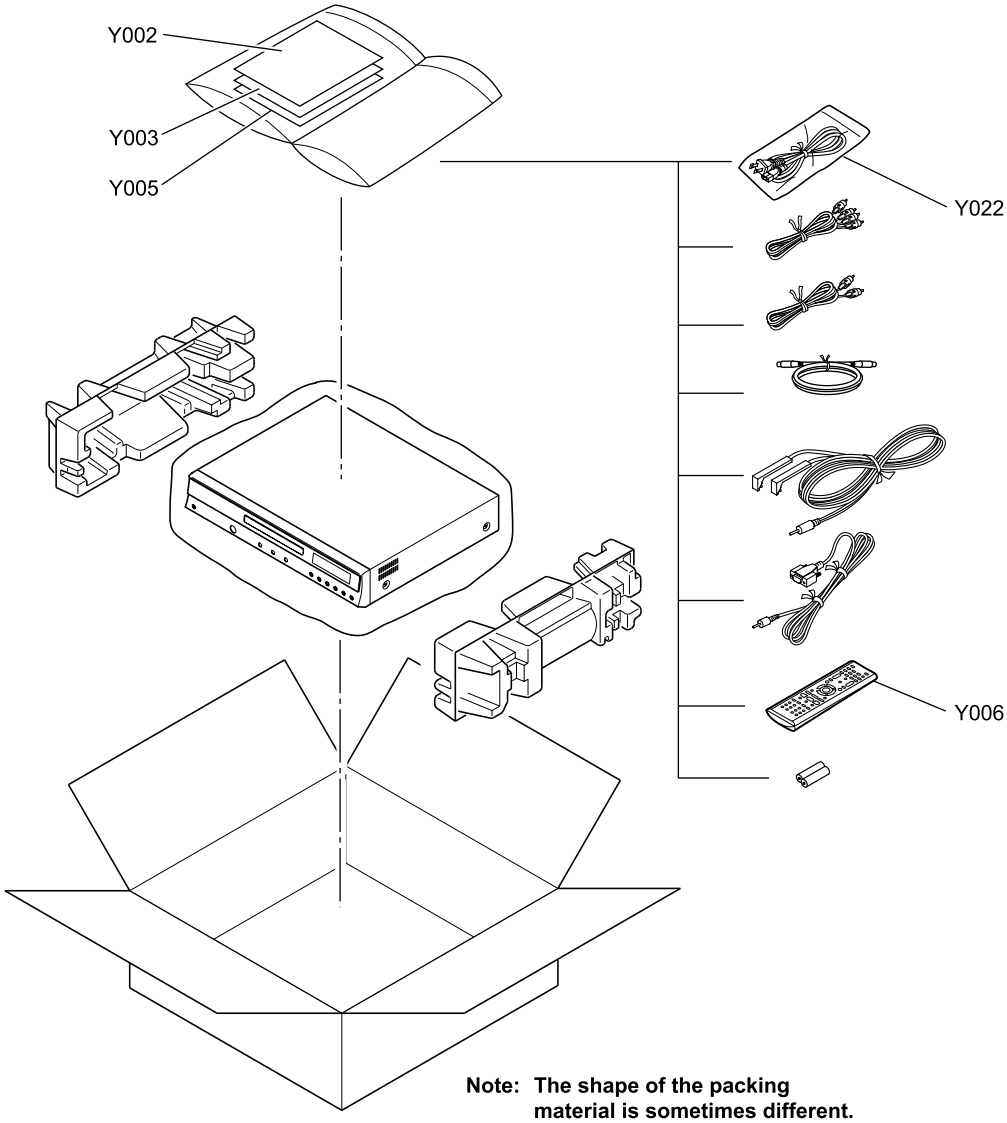
Table 4-3-1

Symbol	B	C	D	F	G	J	K	M
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

Ex. 470ohmJ = 470ohm± 5%

1. EXPLODED VIEWS

1-1. Packing Assembly



Note: The shape of the packing material is sometimes different.

Fig. 4-4-1

1-2. Chassis Assembly

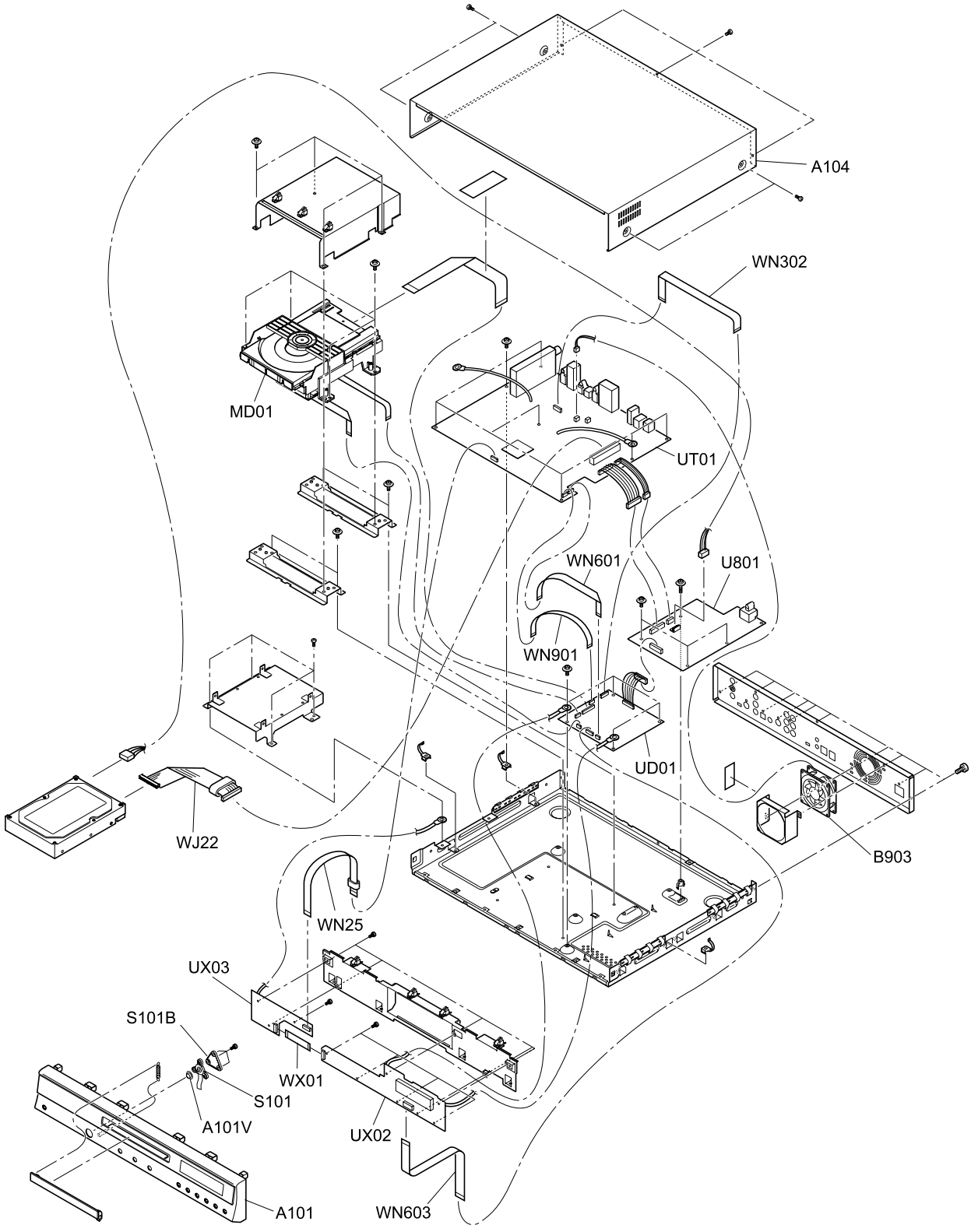


Fig. 4-4-2

2. Parts list

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		- MECHANICAL PARTS -	
A101	P000386770	Front Panel	
A101V	P000386700	Key,Cursor Support	
A104	P000377770	Cover,Top	
B903	P000386780	Fan	
! MD01	P000386650	DVD Mechanism Assy	
S101	79089157	Switch,Tact	RDSY0010
S101B	P000386910	Jog Bracket	
WJ22	P000386790	Cable,ATAPI	40P,L220
WN25	P000386820	Cable,Flexible	FFC,15P,L180
WN302	P000386800	Cable,Flexible	FFC,13P,L300
WN601	P000386810	Cable,Flexible	FFC,6P,L160
WN603	P000386830	Cable,Flexible	FFC,11P,L120
WN901	P000386840	Cable,Flexible	FFC,7P,L60
WX01	P000386850	Cable,Flexible	FFC,13P,L100
! Y002	P000386740	Owners Manual	Operation
! Y003	P000386760	Owners Manual	Viewers Guide
! Y005	P000386750	Owners Manual	Set-up
Y006	P000386730	Remote Control Unit	SE-R0089
! Y022	P000386860	Cord,Power	7A,125V

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		- ELECTRICAL PARTS -	
UD01	P000386660	PC Board Assy	DVD Main
		- INTEGRATED CIRCUITS -	
IC301	79040007	IC	TC7S08F
IC302	79040007	IC	TC7S08F
IC303	79040007	IC	TC7S08F
IC304	79040248	IC	S-80145CLMC-J16
IC305	79040356	IC	W986432DH
IC307	79040357	IC	S-24C02AFJA-TB
IC309	79040391	IC	MBM29DL324BE-90TN
IC310	79040399	IC	MM1561JFBE
IC312	79040354	IC	TC74VHCT244AFTE
IC313	79040354	IC	TC74VHCT244AFTE
IC314	79040007	IC	TC7S08F
IC401	79040282	IC	TC94A03F
IC402	79040323	IC	M11B11664A-30T
IC502	79040296	IC	TA1323F
IC503	79040324	IC	BA5813FM-E2
IC504	79040014	IC	TA75S01F
IC902	79040365	IC	AD1958YRS
		- TRANSISTORS -	
Q301	79050018	Transistor,Chip	2SA1162
Q302	79050018	Transistor,Chip	2SA1162
Q303	79050018	Transistor,Chip	2SA1162
Q304	79050018	Transistor,Chip	2SA1162
Q305	79050018	Transistor,Chip	2SA1162
Q306	79050018	Transistor,Chip	2SA1162
Q307	79050043	Transistor,Chip	RN1402
Q308	79050001	Transistor,Chip	RN2402
Q309	79050043	Transistor,Chip	RN1402
Q310	79050079	Transistor,Chip	2SA1213-Y
Q311	79050016	Transistor,Chip	2SC2712
Q312	79050018	Transistor,Chip	2SA1162
Q401	79050085	Transistor,Chip	2SC3326-B
Q501	79050015	Transistor,Chip	HN1B01F
Q502	79050015	Transistor,Chip	HN1B01F
Q503	79050079	Transistor,Chip	2SA1213-Y
Q504	79050043	Transistor,Chip	RN1402
Q505	79050014	Transistor,Chip	HN1C03F
Q506	79050085	Transistor,Chip	2SC3326-B
		- DIODES -	
D501	79060022	Diode,Chip	1SS368
D502	79060022	Diode,Chip	1SS368
D901	79060102	Diode	1SS184
		- MISCELLANEOUS -	
X901	79089166	Oscillator,Crystal	27MHz
! U801	P000386670	PC Board Assy	Power
UX02	P000386680	PC Board Assy	KDB(Front)
		- INTEGRATED CIRCUITS -	
ICX01	P000386900	IC	TMP86CK74AFG-4VF0
		- TRANSISTORS -	
QX43	79050089	Transistor	RN2401
		- DIODES -	
DX10	79060015	Diode	1SS133
DX11	79060015	Diode	1SS133
DX32	P000386920	Diode,LED	SLR-325VR
DX33	P000386930	Diode,LED	L-115VDGSYKW
DX34	P000386940	Diode,LED	L-7113DGD
		- MISCELLANEOUS -	
GX01	P000386950	Display,FL	8-BIT-230GNKM
SX03	P000387150	Switch,Tact	E4397S002
SX04	P000387150	Switch,Tact	E4397S002
SX05	P000387150	Switch,Tact	E4397S002
SX06	P000387150	Switch,Tact	E4397S002
SX07	P000387150	Switch,Tact	E4397S002
SX08	P000387150	Switch,Tact	E4397S002
SX09	P000387150	Switch,Tact	E4397S002
SX10	P000387150	Switch,Tact	E4397S002
SX11	P000387150	Switch,Tact	E4397S002
ZX02	P000386960	IR Receiver	E5002V001
UX03	P000386690	PC Board Assy	Switch
		- DIODES -	
DX30	P000386970	Diode,LED	S3097V004
		- MISCELLANEOUS -	
SX02	P000387150	Switch,Tact	E4397S002

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
UT01	P000386710	PC Board Assy	Tivo Main
		- INTEGRATED CIRCUITS -	
ICY03	79089159	IC	TOTX179
		- CAPACITORS -	
CTN2	P000387000	Jack,Mini Plug	
		- MISCELLANEOUS -	
! BT1	P000387090	Battery,Lithium	CR2450-FT2-1
CN3000	P000386980	Jack,Modular	KM17001DB4G
CTN12	P000386990	Jack,USB	
! F3001	P000387010	Fuse,Resettable	
! F3002	P000387010	Fuse,Resettable	
JT43	P000387160	S-Jack	HDC-056
JT48	P000387020	Pin Jack	3pin
JT5	P000387160	S-Jack	HDC-056
JT7	P000387030	Pin Jack	6pin
JTX01	P000387170	Pin Jack	HTJ-032-05BO
ST1	P000387040	Switch,Slide	
ST16	P000387040	Switch,Slide	
UT4	P000387050	Tuner	

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN